ASK THE EXPERT:
THE EMERGENCE OF DIGITAL PCR

PERSPECTIVE ON:
A CELL CULTURE LAB

INSIGHTS
LAB TECHNOLOGY BUYER'S REPORT

CO_2 INCUBATORS
WWW.LABMANAGER.COM

Lab Manager®

Run Your Lab Like a Business

November 2014 Volume 9 • Number 10

THE GOOD, THE BAD, AND THE SELFIE

SOCIAL MEDIA'S ROLE IN THE SCIENTIFIC COMMUNITY

GOT GAS?

THE BEST SOURCES, SYSTEMS, & DELIVERY

HOW TO MAKE OTHERS MORE RECEPTIVE TO YOUR IDEAS

WHY POLYPROPYLENE?

ASCB BOOTH 330

NUAIRE POLYPROPYLENE FUME HOODS AND CASEWORK

are constructed of stress relieved and reinforced white thermoplastic polypropylene built to stand the rigors of the corrosive environment.

LEARN WHY POLYPROPYLENE IS RIGHT FOR YOU.
www2.nuaire.com/04820

NuAire, Inc. | 2100 Fernbrook Lane | Plymouth, MN 55447 | U.S.A. | 763.553.1270 | **www.nuaire.com**

© Copyright 2014 NuAire, Inc. All Rights Reserved.

Panasonic

Life Science

cellIQ™

INTELLIGENT CO_2 INCUBATOR

Smart

TOUCH SCREEN INTERFACE

2 min

CO_2 RECOVERY

8x Faster

DECONTAMINATION

Rethink cell growth.

Empower your cell culture through the most advanced user interface and technology. Optimize your environment with a new intelligent touch screen for precise CO_2 recovery, uniform temperature control, and rapid decontamination.

Discovery powered by precision™

us.panasonic-healthcare.com/celliqseries

Lab Manager®
Run Your Lab Like a Business

10 **The Good, the Bad, and the Selfie**
Social media has insinuated its way into every corner of the scientific enterprise—employment and hiring, career trajectory, research practices, collaboration, marketing, publications, internal communication and outreach, and commerce. But is it helping or hurting the scientific community?
F. Key Kidder

46 **Perspective On: A Cell Culture Lab**
Dr. Chris Fasano's lab at the Neural Stem Cell Institute in Rensselaer, New York is dedicated to finding the cause of autism. He shares the rewards and challenges of working with young students on discovering the secrets of early brain development.
Rachel Muenz

BUSINESS MANAGEMENT

16 **In the Mix**
The modern laboratory manager's role requires an intimate understanding of how safety, productivity, and sustainability work together to determine the success of their entire operation in achieving accurate results and containing costs. One of the biggest challenges of running a successful lab operation is meeting all these expectations without sacrificing any one of them.
Steven Daley

LEADERSHIP & STAFFING

20 **Negotiating Agreement**
Have you ever presented a great idea, only to see it ignored while other less important things were discussed? This happens to everyone, but it is especially painful for those in the workplace. STEM professionals tend to think and believe in facts, numbers, and logic, rather than feelings. Yet feelings have a strong effect on decision-making.
Donald Truss

TECHNOLOGY

28 **Got Gas?**
When considering laboratory gas sources, there is growing pressure among lab managers to stay abreast of the requirements for the latest analytical equipment while also attempting to find solutions that optimize efficiency gains and minimize costs. When making a decision on gas supply, your analytical workflow may depend on making the right one.
Trevor Henderson

HEALTH & SAFETY

34 **A Preventive Approach**
Prevention programs are effective and do reduce workplace illnesses, injuries, and fatalities. Want a successful health and safety program? Follow some specific guidelines for developing a solid, proactive approach to protecting your employees from potential hazards in the workplace.
Vince McLeod

FIND OUR FAKE AD AND WIN! More info on page 88

ONLINE EXCLUSIVES

We always love connecting with our readers via our Facebook and Twitter pages. Recently, we turned some great feedback from you on the topic of music in the lab into an online-exclusive article on Labmanager.com. You can find that article at this link: www.labmanager.com/labmusic. We are hoping to have more online-only articles in the future and we'll need your help for many of them, getting your opinions through Twitter and Facebook about a variety of "fun" topics in the lab, such as artwork in the lab, weird lab rituals, and a variety of others. Be sure to keep an eye out on social media for opportunities to share and connect with us and your fellow readers.

AMETEK®
MATERIALS ANALYSIS DIVISION

Patent No. US 8,649,006 B2

Ar gone

ICP OES

Innovative SPECTROBLUE ICP-OES eliminates expensive gas purging.

Unique sealed, no-purge optical technology lets SPECTROBLUE save you thousands of dollars a year versus ordinary spectrometers. And this compact instrument saves even more with a patented air-cooled design that eliminates costly, complicated external water chilling. Besides cutting costs, SPECTROBLUE raises routine elemental analysis performance to new levels with advantages such as its robust, powerful generator and choice of radial-, axial-, or twin-view plasma interfaces. So SPECTROBLUE can provide among the industry's highest levels of resolution, sensitivity, stability, and throughput for your industrial or environmental applications.

FREE WHITE PAPER "How new spectrometer technologies substantially cut operating costs"

http://icp-oes.spectro.com/BLUE **800•548•5809**

SPECTRO

NEW!

Introducing the
VersaCool
Refrigerated
Circulating Bath

We started with the form factor: how to gain a large work area with a limited footprint. As with most great innovations – the solution was simple – we removed the control head to create more space. **We lost our head, so you don't lose your cool.**

• thermoscientific.com/versacool

help me go headless

Thermo
SCIENTIFIC

LAB MANAGER ACADEMY 24
HAVE FUN MAKING WORK, WORK FOR YOU! **Dr. Patt Schwab, CSP**

SCIENCE MATTERS 26
THE POLITICS OF PERSONALITIES **Mark Lanfear**

ASK THE EXPERT: 32
THE EMERGENCE OF DIGITAL PCR
Reginald Beer, PhD, medical diagnostics initiative leader at Lawrence Livermore National Laboratory, discusses the trends and innovations in digital PCR. While touting the advantages of digital PCR, he explains why not every lab needs to invest in this technology. **Tanuja Koppal**

PRODUCT FOCUS
LABORATORY MILLS 40
HOMOGENIZERS 42
GC COLUMNS 44
LABORATORY WASHERS 45

SURVEY SAYS, ARE YOU IN THE MARKET FOR...
MICROPLATE HANDLERS 51
BIOLOGICAL SAFETY CABINETS 52
CENTRIFUGES 56

INSIGHTS 58
A BUYER'S REPORT ON CO_2 INCUBATORS **Angelo DePalma**

TECHNOLOGY NEWS 62
The latest equipment, instrument, and system introductions to the laboratory market.

MAINTENANCE MATTERS 68
LABORATORY BALANCES

HOW IT WORKS
AN EASY-TO-USE CELL SORTER 70
A MINI PLATE SPINNER 72
A SINGLE-STEP SPILL AGENT 73

PRE-OWNED EQUIPMENT MARKETPLACE 89

ADVERTISERS INDEX 89

PARTING POINTS 90

Lab Manager® (ISSN: 1931-3810) is published 11 times per year; monthly with combined issues in January/February, by LabX, P.O. Box 216, 478 Bay Street, Midland, ON Canada L4R 1K9. USPS 024-188 Periodical Postage Paid at Fulton, MO 65251 and at an additional mailing office. A requester publication, Lab Manager, is distributed to qualified subscribers. Non-qualified subscription rates in the U.S. and Canada: $120 per year. All other countries: $180 per year, payable in U.S. funds. Back issues may be purchased at a cost of $15 each in the U.S. and $20 elsewhere. While every attempt is made to ensure the accuracy of the information contained herein, the publisher and its employees cannot accept responsibility for the correctness of information supplied, advertisements or opinions expressed. ©2013 Lab Manager® by Geocalm Inc. All rights reserved. No part of this publication may be reproduced without permission from the publisher.
WDS Canadian return: P.O. Box 216, 478 Bay Street, Midland, ON Canada L4R 1K9.

POSTMASTER: Send address changes to Lab Manager®, PO Box 2015, Skokie, Il 60076.

BPA WORLDWIDE BUSINESS *Lab Manager Magazine®* is audited by BPA

FastPrep - The Most Advanced, Rapid and Thorough Sample Preparation Systems Ever!

FastPrep-24™ 5G

Super FastPrep-1

FastPrep-96™

Delivering the Most DNA, RNA and Proteins from Routine and Resistant Samples

- **Most Powerful** - Highest speed available, improves quality of analytes
- **Fastest** - Grind, Lyse and Homogenize Toughest Samples in 40 seconds or less
- **Reproducible** - Consistent lysis results every sample with precise, automated control
- **Flexible** - Optional sample holders allow processing up to 250 mL size under ambient or cryogenic conditions
- **Most Consistent** - Eliminate cross contamination with single-use matrix tubes
- **Most Complete** - Lysing Matrix Tubes and Purification Kits from One Source

The MP FastPrep® Family Delivering Extraordinary Results!

Request a Demo!

MP Biomedicals: 800.854.0530

www.mpbio.com/sampleprep

MP™

The Kardashian Effect

This morning Queen Elizabeth made her first foray into the world of social media when she sent the first royal tweet under her own name to declare the opening of a new Science Museum gallery. The Queen's message read: "It is a pleasure to open the Information Age exhibition today at the @ScienceMuseum and I hope people will enjoy visiting. Elizabeth R," and will likely be re-tweeted thousands of times by many of the @BritishMonarchy twitter account's 722,000 followers. Surely a late adopter, the Queen has nevertheless recognized the pervasiveness and usefulness of this new form of communication. New to her, at least.

Which brings us to this month's cover story, "The Good, the Bad, and the Selfie," in which author Key Kidder looks at the role social media currently plays within the scientific community. It is no longer a question of whether to participate, but rather *how* to participate. Some believe making use of social media is crucial to securing ever more limited scientific funding. "As more scientists are compelled to compete for their share of shrinking research resources and funding opportunities, the right touch of social media can provide the soft sell that sustains them in today's harsh economic climate," says Kidder. However, others worry that self-promotion through social media outlets will detract from their work. Dennis Meredith, a science communication consultant and author, urges researchers to observe his three B's when it comes to engaging with social media: be strategic, be useful, and be careful.

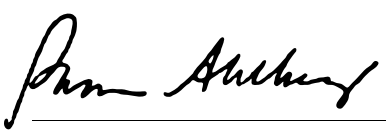
Despite the differing personalities and generational affiliations that may influence their use of social media, most scientific professionals share one thing in common, which is their logical, fact-driven approach to problems. A general assumption is that scientists are not very "touchy feely." However, according to Donald Truss in this month's Leadership & Staffing article, "Negotiating Agreement," being unaware of other people's feelings can be detrimental when it comes to being effective in the workplace. "In every meeting where persuasion is the goal, there is a subliminal dance of feelings that takes place," says Truss. Turn to page 20 to learn the four fundamental turning points in that dance.

Far less "touchy feely," but absolutely critical when it comes to the safety of your lab, is a straight forward, time-tested illness and injury prevention program. Turn to page 34 to find out the essential elements needed to build such a program and how that program can provide a framework to serve as a basis for performing a gap analysis on your existing approach.

As a reader of *Lab Manager*, you know that our primary editorial mission is to help lab managers hone their business and management skills. And of all those skills, the most challenging is managing people. In this month's Perspective On article (page 46), Dr. Chris Fasano, a principal investigator (PI) at the Neural Stem Cell Institute (NSCI) in Rensselaer, New York, speaks to that challenge. "You can teach anyone how to do an experiment, but you can't teach someone how to be motivated," he says. In addition to motivating and training his staff, Fasano recognizes the importance of keeping a positive attitude, especially in these under-funded times. "A lot of people say that science is just not viable as a long-term career anymore. I disagree with that. I think it just takes the right person. You have to keep going and keep trucking through, and eventually your ideas will pan out."

Whether you share Dr. Fasano's upbeat attitude or do or do not embrace social media, we welcome your thoughts on these topics and any others. Please visit us on Twitter and Facebook to share.

Happy tweeting.



Pamela Ahlberg
Editor-in-Chief

Lab Manager®
Run Your Lab Like a Business

Editor-in-Chief	**Pamela Ahlberg** pam@labmanager.com 973.729.6538
Assistant Editor	**Rachel Muenz** rachelm@labmanager.com 888.781.0328 x233
Technology Editor	**Trevor Henderson** thenderson@labmanager.com 888.781.0328 x291
Contributors	**Angelo DePalma, PhD** **Mark Lanfear** **Sara Goudarzi** **Tanuja Koppal, PhD** **F. Key Kidder** **Joe Liscouski** **Vince McLeod, CIH** **Ronald B. Pickett** **Bernard Tulsi** **Mike May, PhD**
Art Director & Production Manager	**Gregory A. Brewer** gregb@labmanager.com 888.781.0328 x241
Senior Designer	**Danielle Gibbons** danielleg@labmanager.com 888.781.0328 x237
List Rental	**Jen Felling—Statlistics** 203.778.8700
Custom Article Reprints	**The YGS Group** labmanager@theygsgroup.com 800.290.5460 717.505.9701 x100
Subscription Customer Service	info@labmanager.com
Account Managers	**Edward Neeb** Northeast edwardn@labmanager.com 860.350.2761
	June Kafato International junek@labmanager.com 705.812.2332
	Larry Frey Southeast, Midwest & West larry@labmanager.com 845.735.5548
	Alyssa Moore Mid-Atlantic amoore@labmanager.com 610.321.2599
Business Coordinator	**Andrea Cole** andreac@labmanager.com 888.781.0328 x296

Published by LabX Media Group

President	**Bob Kafato** bobk@labmanager.com 888.781.0328 x223
Managing Partner	**Mario Di Ubaldi** mariod@labmanager.com 203.227.1390
General Manager	**Ken Piech** kenp@labmanager.com 888.781.0328 x226
Publisher	**Edward Neeb** edwardn@labmanager.com 860.350.2761

P.O. Box 216, 478 Bay Street Midland, ON, Canada L4R 1K9

Experience the quintessence

Milli-Q® Integral system
pure and ultrapure water at your fingertips.

- Dual POD (point-of-delivery) concept saves space and increases convenience.
- Lower running costs and water waste with exclusive Elix® technology.

Experience More www.millipore.com/ultrapure

EMD Millipore is a division of Merck KGaA, Darmstadt, Germany

THE GOOD, THE BAD, AND THE SELFIE

SOCIAL MEDIA'S ROLE IN THE SCIENTIFIC COMMUNITY

BY F. KEY KIDDER

The barbarians were at the gates, the handwriting on the wall. Their digital firepower was unstoppable. Without further ado, they stormed the ramparts, overrunning scientific strongholds. There is no turning back now. Social media is a juggernaut, its impact profound and already making itself felt in ways that few could have envisioned.

Revolutions rearrange the established order. On one side are the disrupters, agents of change who champion social media. The diehards have a different drift—many of the old lions and scientists in positions of power are defenders of the status quo. Betwixt and between are the majority of scientists, who are of different minds about social media.

Digital tumult rattles science in its entirety. Researchers certainly hear the roar. Social media has insinuated its way into every corner of the scientific enterprise—employment and hiring, career trajectory, research practices, collaboration, marketing, publications, internal communication and outreach, and commerce.

> "Social media has insinuated its way into every corner of the scientific enterprise."

Is nothing sacred? Old ways of doing business are under attack. Most everything scientists were taught about how to ascend—soldier on, keep your head low, and await your turn—is being turned on its head by fast risers. Engagement with society at large was once the occasional necessary evil. Now it's encouraged, the better to make a case for socially relevant research that funders increasingly expect. The entire book on communications is being rewritten; don't expect the new one to be completed anytime soon, because the change is ongoing and near stupefying in scope. Research resources have never been as rich, abundant, or accessible. And journal peer review, long the final word on scientific progress, finds itself besieged by digital discourse that seeks to reaffirm and restore the indispensable scientific element of trust.

Some of the changes social media wrought in 2014 were less weighty but nevertheless added buzz to the narrative. Who said science wasn't sexy enough to attract young talent? Full-figured Kim Kardashian was somehow inserted into the controversy. And for all those who bemoaned the fact that most Americans cannot name a single scientist, recent headlines trumpeted the rollout of the first celebrity lists of scientists—"20 Chemists Worth Following on Twitter" or "These 40 Science Experts Will Completely Revamp Your Social Media Feed." Are the names on these lists great scientific minds or skilled social media users?

No sooner had social media managed to get one foot inside the gates of the research community then legions of doomsayers warned of the cheapening effects this paragon of popular culture and its attendant communication platforms would impose on the good name of deliberate science. And while numerous scientists have since succumbed to social media's inevitability—reasoning they will miss the boat so many others have caught—many remain suspicious of social media's shiny offerings.

CYTATION 5
imaging reader

Consistently Brilliant Microscopy & Remarkable Data

DO | WHAT YOU NEVER THOUGHT POSSIBLE

Cytation™ 5 is the compact, automated cell imaging and multi-mode reader that easily and quickly captures and analyzes brilliant images and transforms them into meaningful results. Simplicity, precision and flexibility—all in one powerful bench top solution.

Find out what is possible, visit **www.cellimager.com**

Think Possible

BioTek®

www.biotek.com

Still others resent colleagues who revel in them, figuring it exacts an opportunity cost on their research. "If you're serious about a research career, it's easy to invest too much in social media," said Jim Austin, who heads up the American Association for the Advancement of Science's careers section of the journal *Science*.

Senior scientists are quick to trot out the cautionary tale of astrophysicist Carl Sagan. Back in the 1980s, he was riding high as the public face of science. His TV show *Cosmos*, broadcast in 60 countries, was said to be the most watched program in public television's history. He had a hand in 20 books and published 600 scientific papers. His elevation displeased colleagues. Despite having awarded him its highest honor, the National Academy of Sciences denied Sagan membership.

But as more scientists are compelled to compete for their share of shrinking research resources and funding opportunities, the right touch of social media can provide the soft sell that sustains them in today's harsh economic climate. Mastery of digital communication platforms can become a matter of self-preservation, as microbiologist Jonathan Eisen explains in "To tweet or not to tweet" in the careers section of ***Science***.

"Mastery of digital communication platforms can become a matter of self-preservation."

As one who works the edges of science communication, the tenured Eisen experiments "with new tools for communication in the same way I would actively test a new microscope." Judicious social media exposure opens doors to recognition and grants, he says. "People cite my work more almost certainly because they've heard about it more" on blogs or Twitter. And other scientists most certainly are inclined to take potshots at him, as did a reviewer who questioned Eisen's mental "bandwidth." Social media's forward curve remains a charged and contentious space for researchers to occupy.

Prolific Twitter users like Eisen were exactly the kind that Great Britain's Neil Hall had in mind this past summer when he proposed a Kardashian Index that measures the number of Twitter followers against the number of citations that a scientist has accrued. Scientists with high scores, suggests Hall, may be "seen as leaders in their field simply because of their notoriety" derived from their dalliance with social media. Ms. Kardashian is famous for being famous. Hall is "concerned that phenomena similar to that…may also exist in the scientific community."

His lighthearted proposal produced a Twitter storm of both blowback and approval, sometimes from the same source, reflecting the general ambivalence of the rank and file and the quandary faced by scientists torn between the old and the new.

"There is a lot of noise out there, a lot of people communicating about the value of social media," said Jamie Vernon, director of science communications at Sigma Xi and editor-in-chief of *American Scientist*. "With so many competing voices, it's hard for scientists to decide who to listen to." Vernon cites an article that "essentially" questioned the qualifications of scientists with a high K-Index but then continued on to list the "top 50 science stars" based on their scores.

Besides dealing with overblown social media reputations, Hall's paper tacitly underscored the discrimination women face in the scientific community. "Interestingly, in my analysis, very few women (only one, in fact) had a highly inflated Twitter following while most…had fewer followers than would be expected. Hence, most Kardashians are men!" But Vernon says women are "capitalizing on their ability to come together (via social media) to bring down barriers," citing the example of Hope Jahren, who runs a geobiology lab at the University of Hawaii at Manoa.

The fully tenured Jahren was stunned when a longtime male colleague inadvertently emailed her a letter he wrote to the department chair that described her work as "pathetic" and asked "Do she otherwise contribute to the Dept? (sic)" That email, said Jahren, "was a love letter compared to some of the stuff I heard as a student." Her subsequent postings protesting her treatment continued to stir the controversy and spark debate.

Fresh research that sheds light on scientists' use of social media is emerging, fortunately. A 2013 study of nanotech researchers ("Opinion: Tweeting to the Top," Yeo; Brossard; Scheufele; Nealey; Corley) provided some of the first empirical evidence of the impacts of scientists using online tools to interact with lay audiences. Engaging in Twitter activity with journalists increased peer-reviewed articles published and citations; the study further showed that exploiting Twitter amplified one's prominence compared with scientists who weren't users. An online presence is a near necessity for professional scientists, but this study indicates the career rewards of an *active* presence.

Not that long ago, "we were all scrambling around, excited just to have a (social media) platform," said Vernon. As social media matures and usage becomes "more professionalized, we have to be more rigorous about analyses" that build the case for best practices.

Twitter's eminence as the social tool of choice is owing to the perception that it is a more professional platform than Facebook, which in turn is considered superior for the dissemination of personal information

A&D WEIGHING

Laboratory
Solutions

Balances

Pipette Management

Moisture Analyzers

Viscometers

Download the new guide:
12 Tips to Make Stable Microbalance Measurements
www.andweighing.com/ion

A&D Weighing

and so lends itself to the architecture supporting the vast new research networks that are transforming laboratory practices. Network-enabled research, remarked one user, has approximately the same relationship to traditional research as driving has to pushing a car—it's a problem-solving dream.

> "Very few women...had a highly inflated Twitter following while most...had fewer followers than would be expected."

"Such possibilities have long been dreamed of," said Jim Austin, who heads up the careers section of the journal *Science*, a solid platform that's "truly social in a scientific context," complete with its very own social tool kit to connect global users that opens up a new world of collaborative possibilities.

Similar efforts in the past "seemed to be a waste of time," said Austin. But ResearchGate, often called Facebook for scientists, rolls with the momentum of a membership approaching five million—each and every one a scientist. Just as Facebook revolutionized users' digital presence a decade ago, ResearchGate is a game changer that increases the visibility of research and citations and allows users to track who is citing them and their publications—an optimal networking opportunity. Academia.edu boasts a bigger membership of 12 million, but anyone can sign up. It's an idea that has caught on—social networking sites continue to proliferate, many discipline-specific.

A survey undertaken by *Nature* that studied the social media activity of more than 3,000 scholars and engineers found that nearly half visited ResearchGate regularly. (Google Scholar was the leader with 60%.) LinkedIn was third with 41%, followed by Facebook at 38%. Twitter (13%) and Academia.edu (5%) weren't even close.

"When scientists want to seriously talk science using social media, they go behind closed doors to sites like ResearchGate for their nitty-gritty conversations," said Vernon. "Some scientists are shy about going public on Twitter with what they're thinking. Social network communities are a safe place to ask hard questions and get the right kind of feedback."

These same networks, in concert with other social media platforms, have assumed *de facto* responsibility for rectifying research falsehoods that slip through the editorial review processes of journals. Image and data manipulations that toy with the truth and other miscues are increasingly being flagged through crowd-sourced, post-publication peer review—a development not without controversy. Some question the wisdom of giving junior scientists a forum "where any unhinged idiot with an Internet connection can rage away against a highly technical paper that he doesn't get," said one observer. Others suggest that such blowback is a thinly disguised power play to maintain control, since post-publication peer review often gives voice to the marginalized.

Nobody has a more colorful take on the situation take then does Zen Faulkes, a biologist at the University of Texas - Pan American:

"Post-publication peer review through traditional scientific publishing is like kabuki theater: a slow, rehearsed drama in which the viewer must recognize the subtle profundities of performers wearing deliberately ambiguous masks.

"Post-publication peer review on social media is like the mosh pit at a punk rock show. It's fast, uncoordinated, a lot less subtle, more in your face, and involves a few more risks."

Then again, social media is inherently risky, says Dennis Meredith, a science communication consultant and author who reminds us that too many scientists proceed without being fully informed and become "overwhelmed with tools and techniques and are probably confused about how to use social media to their advantage. They suffer from sins of commission, like jumping into Twitter or starting blogging without a strategic plan, or sins of omission, opting out of media pathways that may be beneficial."

REMOTE VACUUM CONTROL
from any desktop or mobile device!

vacuubrand
www.vacuubrand.com

By strategic, Meredith means "using the same discipline and strategy a manager might use in designing research programs." Consulting available literature is a smart first step. Meredith recommends the Public Library of Science (PLOS) guide on social media, which "takes a strategic approach by asking what you want before you jump in, and then gives you the pros and cons." As a rule of thumb, Meredith urges researchers observe his three B's: be strategic, be useful, and be careful.

Social media is loosening the grip that trade shows and conferences have held on product marketing. These venues remain vital for developing leads and learning the wants and needs of customers, but more manufacturers are turning those conversations into social media offerings to help press their case.

"When scientists want to seriously talk science using social media, they go behind closed doors."

Lab instruments are one example—Bio-Rad Laboratories, which makes a range of life science research products, developed interactive tutorials targeting bench scientists and complementing the written content for its nucleic acid detection and analysis systems. The response has been favorable, says marketing manager Paul Streng. Concise educational animations that provide "tips and tricks for successful research" have generated positive feedback. "If customers see [social media] as a sales pitch, it diminishes" the message, said Kevin McLaughlin, senior marketing communications specialist for Shimadzu Scientific Instruments.

F. Key Kidder *left journalism to pursue a career in government relations, politics, and PR, but he still likes to keep his hand in writing. He can be reached at k2@keykidder.com or by phone at 410-963-4426.*

As the challenges grow, so does The Baker Company.

It's an evolution guided by the integrity we're known for.

We are building on our achievements, adding capabilities and products distinguished by the same uncompromised engineering and quality.

Thousands of researchers around the world depend on us, and we will stay worthy of their trust. Because we want to go wherever the challenges are greatest.

BAKER

Environments For Science™

To see whats new at Baker visit: bakerco.com

IN THE MIX

BEST PRACTICES FOR CHEMICAL PURCHASING by Steven Daley

No matter what field you serve, your role as a modern laboratory manager requires an intimate understanding of how safety, productivity, and sustainability work together to determine the success of your entire operation in achieving accurate results and containing costs. It's no surprise that one of the biggest challenges of running a successful lab operation is meeting all these expectations without sacrificing any one of them.

One effective way to find that balance is to start with your chemicals and focus on using smart chemical purchasing methods. By knowing precisely what chemicals you need and also taking into consideration other chemical purchasing factors such as product size, packaging, container criteria, and supplier support, you can make informed decisions that will help you meet all your laboratory's goals.

More than a catalog list

The first best practice in chemical purchasing is perhaps the most important—choosing the right supplier. Improving laboratory safety and productivity while producing dependable results, all in a sustainable work environment, begins by identifying your laboratory's chemical needs—a step that should be done in partnership with an expert supplier. Experienced lab managers know there is more to purchasing chemicals than looking at processes and applications and then flipping through a catalog to see what fits. Proper inventory management is key, which means buying only what is needed, when it's needed, and in the right volume, grade, and package. While it may seem elementary, a dependable chemical supplier is a vital contributor to these decisions and can help make the purchasing effort more efficient.

An effective chemical supplier will partner with you to evaluate all your chemical-related lab processes, applications, and product needs. They will assist with gathering application information, product numbers, chemical grades, and package sizes so your chemical selection can be optimized for each application. Good supply partners know that these important considerations in chemical selection also affect other facets of lab management, including productivity, safety, and sustainability. So make sure your supplier is doing more than just delivering chemicals; a good supply partner should also support your best practices and laboratory management initiatives.

▲ *Reusable containers can provide a sustainable alternative to disposable bottles, single-use containers and one-way drums, and can reduce chemical waste and disposal costs for frequently used chemicals.*

Be smart about buying in bulk

Buying in bulk can provide many advantages, including less frequent refill change-outs and fewer opportunities for subsequent chemical spills, which translate into a safer, more efficient laboratory environment. Buying in bulk can also mean fewer shipping costs and less packaging disposal, which contribute to sustainability goals.

While bulk purchasing may be an effective way to manage supply and control costs, more isn't always better, so an important best practice is to calculate all the benefits and pos-

sible risks of bulk purchasing, not just the up-front cost-per-unit savings. Overbuying may be less expensive in the context of cost per volume, but it can also lead to wasted chemicals that expire before they are disbursed and result in costly disposal.

For instance, some labs may purchase bulk one-way chemical drums and pump the contents into smaller containers in an effort to reduce costs; however, the integrity of the chemical may be compromised in the dispensing process if it goes into an unclean container, or the lab may end up discarding unused chemicals (with disposal costs) due to degradation or extended exposure to the environment. The large size of the drums also increase the total volume of chemicals in a facility, which means they can become a storage and safety issue if not consumed in a reasonable amount of time.

While the cost per unit may be lower, the use of bulk containers may present additional risks in the lab. For example, a product such as an ACS-grade solvent in a 20-liter container may be difficult for lab personnel to handle due to its size, shape, and weight. In this case, dispensing and handling larger quantities of solvent could lead to a hazardous situation, so it makes sense to order smaller, more manageable-sized bottles to ensure safety while also getting results.

For other applications, a bulk purchase may simply be overkill and smaller batches may better match the workflow. For example, many salts used in laboratory analysis are critical to ensure reliable results, but they are consumed in smaller quantities. While purchasing salts in larger bulk sizes may reduce the cost per gram, it also increases the potential for contamination, clumping and degradation of the product. Conversely, purchasing salts in smaller bottles can ensure your product remains fresh, while reducing or preventing the potential waste of product that has expired or becomes clumped or contaminated.

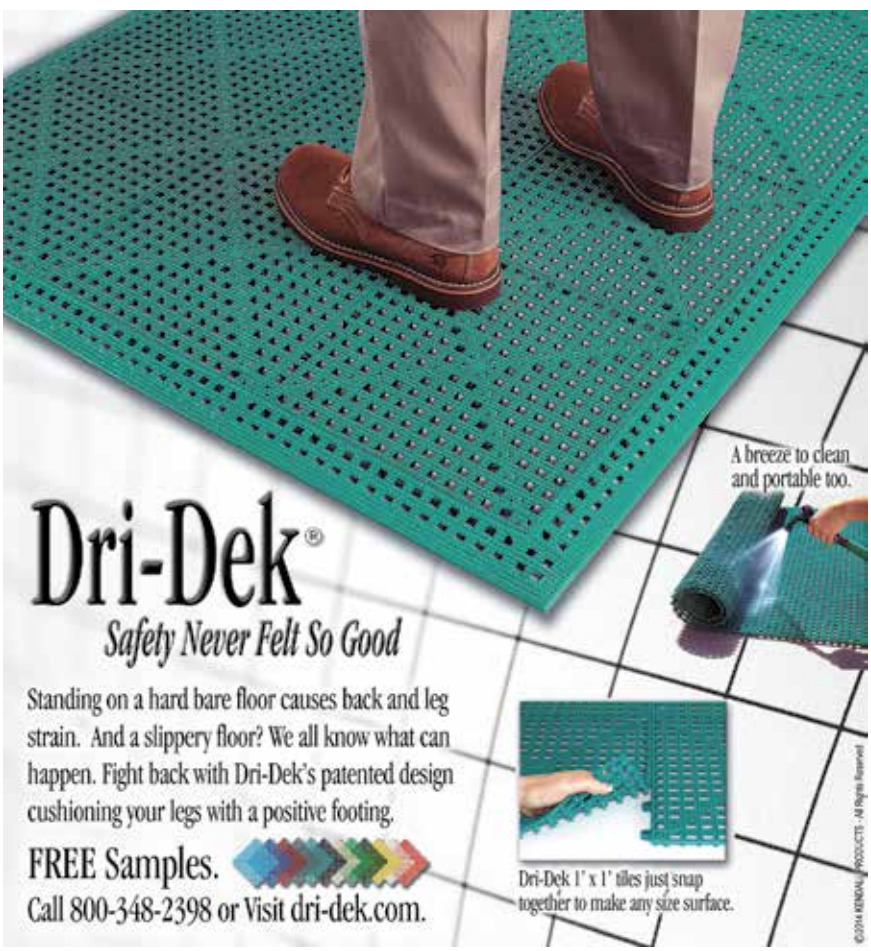
The key is to evaluate your situation carefully and be cautious about overbuying. Instead, consider purchasing chemicals in smaller quantities when applicable so that no product goes to waste.

Nothing more, nothing less

Purchasing chemicals should be like going to the grocery store with a meal plan and a shopping list. You get exactly the ingredients you need, it takes you less time to move through the store, and you don't have to throw anything away at the end of the week. This best practice at home also translates into a best practice in the lab.

For some laboratories, purchasing and using pre-blended chemicals can be an ingredient for saving time and allowing better allocation of laboratory staff, which can impact the total lab operational budget. Purchasing pre-blends can also reduce inventory and conserve storage space, while limiting waste from inaccurate mixing or spillage.

One common pre-blended solvent used by quality control labs is Acetonitrile-0.1% trifluoroacetic acid. In this lab environment, pre-blended solvents for use in liquid chromatography-mass spectrometry can save preparatory staff up to 30 minutes—time that would otherwise be spent preparing the mobile phase. For an application such as high-performance liquid chromatography, there is no need for lab staff to blend on-site. In fact, pre-blended solvents remove the opportunity for human error and the safety risks of handling chemicals, while also ensuring the quality of the end results.


A breeze to clean and portable too.
Dri-Dek®
Safety Never Felt So Good
Standing on a hard bare floor causes back and leg strain. And a slippery floor? We all know what can happen. Fight back with Dri-Dek's patented design cushioning your legs with a positive footing.
FREE Samples.
Call 800-348-2398 or Visit dri-dek.com.
Dri-Dek 1' x 1' tiles just snap together to make any size surface.

▲ *Purchasing pre-blended solvents can save valuable staff time for higher-value tasks, while also removing the opportunity for human error and the additional safety risk of handling chemicals.*

Lab managers can also save costs by matching the quality of the chemistry to the application at hand. For example, some general processes, such as sample prep and sample analysis, can benefit from the use of universal reagents, which can sometimes be substituted for individual technical and reagent-grade chemicals, such as acids, salts, and solvents. Universal reagents can reduce inventory by reducing the number of products needed, thereby conserving space and limiting packaging disposal.

Likewise, using volumetric solution concentrates for analytical processes, such as titrations or dissolution media concentrates for tablet testing, can also help reduce waste and streamline operations by eliminating the need to store and combine multiple component chemicals on-site.

For more stringent processes, talk with your supplier about application-optimized chemicals that are specifically developed and engineered for your methodology. Application-optimized chemicals can maximize accuracy and reproducibility, while avoiding inconsistent or substandard results that can lead to wasted material and time for correcting experiments.

Size, space, and safety

The chemical products you purchase have a direct effect on how smoothly your operation flows, the quality of your results, and the waste and disposal of unused portions. In addition to considering the volume or quantity that is needed for a chemical product, another best practice is to consider the physical size of the product packaging, as the space occupied by your chemical inventory is in many ways just as important in the purchasing process.

One benefit of matching the volume of chemical products to your exact need is that you can better control the amount of space required for storage. For instance, the size of the product packaging has a direct impact on the ease of movement by your personnel around the laboratory. Storing unnecessarily large quantities can hamper the flow of activity in the laboratory and in some cases even cause trip hazards and other safety risks. By contrast, proper product sizing also limits change-outs, reduces the number of open containers, and limits disposal of spoilage and/or excess product—all of which reduce safety risks to personnel.

Packaging and containers

In addition to physical size, other aspects of a product's packaging or container should be considered as part of your chemical purchasing best practices due to their impact on various aspects of your operation—including product integrity, safe handling, sustainability measures, storage requirements, and disposal costs.

> Purchasing chemicals should be like going to the grocery store with a meal plan and a shopping list."

Specialty packaging, for instance, is designed to protect product integrity, which means less waste and more reliable lab results. For example, anhydrous solvents that have septum seal caps allow solvent to be extracted from the bottle using a syringe while protecting the solvent from exposure to the environment.

Recyclable and reusable containers, such as Avantor's J.T.Baker® CYCLE-TAINER™ solvent delivery system, provide a sustainable alternative to disposable bottles, single-use containers, and one-way drums. These containers are available in a variety of sizes and can reduce chemical waste and disposal costs by preserving product quality. Also, user-friendly designs with features such as easy-to-use dispensing ports can further complement the environmentally conscious aspects of the reusable container by reducing the opportunity for spills and waste.

And finally, purchasing chemicals in poly-coated bottles that are easier to grip and resist shattering in case the bottles get dropped can provide additional safety when handling acids and solvents. These bottles are also designed to contain the chemical for a short period of time if the bottle does break, making it easier to clean up.

Supplier support

Don't overlook a very important aspect of the relationship with your chemical products supplier—their ability to consistently meet your chemical demands to avoid rush deliveries and the potential for the accompanying unnecessary costs. An unbalanced supply/demand relationship with your supplier can lead to rushed work, mistakes, safety risks, and expensive rework, so make sure your supplier has the global resources to meet your needs, especially in times of local chemical shortages.

Another important aspect of supplier support is electronic documentation, which is essential for a modern laboratory to run safely and efficiently. It is imperative that all labs prepare for GHS labeling requirements that are designed to promote the safety of lab workers. Make sure your supplier can provide excellent electronic documentation to help you comply with these new requirements.

Chemical providers with comprehensive electronic documentation can also help you reduce paper waste and enable faster communication for quick responses to changes in your daily lab needs.

Materials sourcing and electronic catalogs and data sheets are just a few of the common documentation tools provided by suppliers to increase efficiency and streamline laboratory functions. Some chemical suppliers even offer mobile apps that allow smartphones and tablets to instantly access product information. A quick scan of a product bar code, for example, can provide information such as product specifications, certificates of analysis, material safety data sheets, and container and packaging information. In your purchasing practices, consider how each of these tools can support the fast pace and high-productivity environment of a modern lab.

Boiling it down

Purchasing the right chemicals in the right volume, grade, and packaging is a critical first step to any laboratory's success. However, understanding how these choices affect the broader goals of safety, productivity, and sustainability is best achieved with the help of a dependable supplier. A good supplier will work with you to implement these best practices and optimize the entire ordering process, from selection through delivery. Together, your thoughtful and informed decisions can control costs, ensure quality results, foster safety in the workplace, and reduce waste—all important contributions to realizing your lab management goals.

Steven Daley *is vice president of sales, laboratory products for the Americas, at Avantor Performance Materials in Center Valley, Pennsylvania. He can be reached at steve.daley@avantormaterials.com.*

BEAT
the Threat
of
Contamination!

How do you achieve
OPTIMAL CELL
GROWTH?

- Contamination free CO_2 Incubator with 180 °C hot air self-sterilization
- Reduced interior surface without a fan
- Temperature uniformity and accuracy Modern, well insulated air jacket
- Stable and uniform pH value Drift free unique IR sensor
- High humidity without condensation Patented re-condensation system

go2binder.com/us-C02-stack

2 CO_2 C150 incubators
plus stacking adapter

SPECIAL
ONLY
$ 9,999
Over $4,000
savings

Stack C 150 115 V UL R hinge 5.4 cu.ft # 9040-0077
Stack C 150 115 V UL L hinge 5.4 cu.ft. # 9040-0086

BINDER
Best conditions for your success

www.BINDER-World.us
Phone 631-224-4340
Fax 631-224-4354 Toll Free 1-866-885-9794

NEGOTIATING AGREEMENT

HOW TO MAKE YOUR IDEAS MORE RECEPTIVE TO OTHERS

by Donald Truss

"I believe that if an appropriate experiment could be devised, I could prove that no buying decision has ever been made based solely on the facts."
- Michael Gerber, "The E Myth," 1986.

"I believe that everyone lives by selling something." - Robert Louis Stevenson, 1894.

Have you ever presented a great idea, only to see it ignored while other less important things were discussed? This happens to everyone, but it is especially painful for those of us in the workplace.

As fellow STEM professionals (STEM = Science, Technology, Engineering, Math), we tend to think and believe in facts, numbers, and logic. We are less likely to pay much attention to, and often do not recognize the importance of, other people's feelings in our day-to-day discussions. However, feelings have a strong effect on our perceptions and decision making.

"You must take the time required to get the buyer to trust you and to feel understood."

If the word "feelings" makes you uneasy, you are not alone. That's why we studied STEM topics in the first place—we like facts and tangible reality, even when it is the form of things we cannot see, such as atoms and electromagnetic radiation. We are analytical and we like dealing with things that can be measured—not fuzzy, transient, and unprovable, such as a person's feelings. But we are members of a team and we often need to convince others in our group to buy into our ideas. If you want someone to do something for you, and if you want to be more convincing, then follow these steps.

The best idea does not always win the argument. Feelings, more than logic, will determine a person's decisions and actions. For example, think about the last time you bought toothpaste. Did you pick up each tube and rationally consider all the ingredients? Did you suspect or have a feeling that the label may be misleading? Did you believe all of the "proofs" stated on the label? Did you consider the psychological effects of the colors on the box or the font used in the title? Probably not. After all, we are STEM professionals.

"My master's degree in synthetic chemistry has helped me to become immune to these feeble attempts to sway my decision regarding which toothpaste to buy."

I promise that the more you understand how the other person is feeling during a discussion, the more likely you will be able to convince them to agree with you.

When I was young and a member of The Boy Scouts of America, we engaged in a very enlightening exercise. We spent an entire day working together as a team, without being allowed to speak to or with each other. We moved logs and assembled benches, and it was amazing just how well we understood the other persons' thoughts and intentions after quietly, patiently watching them in silence. This is exactly the skill you need to practice if you want to become a better communicator.

ADAM®

Nimbus®

Sky-High Performance, Down-to-Earth Value

The newest star on the laboratory horizon is the Nimbus® balance by Adam Equipment. Nimbus delivers performance and features for everyday lab work, at a value that is light years ahead of the competition. With 15 streamlined models offering readabilities from 0.1mg to 0.1g, Nimbus provides an intuitive user interface, compact footprint and clear glass weighing chamber. The forecast is bright with Nimbus in your laboratory.

Learn more about Nimbus
www.adamequipment.com/nimbus

©2014 Adam Equipment Inc. All rights reserved. NA-4085

Picking the right time and place makes all the difference in your ability to be heard. Start the conversation not when it is convenient for you, but rather when it is convenient for the other person. Be strategic. Make an appointment, or find them when they are relaxed. We are all creatures of habit and fall into transition rituals—patterns of behavior before settling down to work or getting in the car to drive home. Take time to recognize these patterns and then choose the time and place when they will be most likely to hear you. First thing in the morning, before the day's problems have arrived, is often a good time. After lunch, while they are full and in a good mood is also good. At the end of the day, when they are looking for relief from the problems they are facing can be an excellent time. This process is an "art," and everyone is different. Paying attention and being strategic is the key to success.

THE FOUR TURNING POINTS—THE SUBLIMINAL DANCE BETWEEN BUYER AND SELLER

In every meeting where persuasion is the goal, there is a subliminal dance of feelings that takes place. Very few of us are trained to see this, so you may need to practice. There are four fundamental turning points in this dance, and learning to recognize them will lead to increased success. In our examples, we will have a "buyer" and a "seller." Of course, the seller is trying to convince the buyer to agree.

The first turning point is called "breaking the ice." Here you allow the buyer of your idea to feel in control by allowing them to make the choice of when to get serious and talk business. The second turning point is getting the buyer to admit that they have a need. The third turning point is to deliver your solution to the buyer's need. The fourth turning point is to wait to see the buyer's decision to go forward in the buying process.

1. Break the ice.

When you start the conversation, always start by talking about the weather or the game last night, and wait for them to say something showing that they are ready to talk business. He or she may say something like "Why are you here?" or "Did you want to discuss something with me?" By waiting for them to start the conversation, you have given them the feeling that you are a cooperative, controllable, and nonthreatening person. By waiting to obtain their permission to advance, you have given them a subliminal warm and fuzzy feeling of security.

2. Get the buyer to admit they have a need.

Now you will be tempted to "water the garden with a fire hose," and you must resist this temptation. Your goal in this part of the discussion is to get them talking about their goals and concerns, and the consequences if these goals are not met. Start by talking about the common goals that you share with this person, and listen carefully to how they feel they are doing at meeting these goals. They obviously have "pain" if their goals are not being met. Ask questions to keep them talking and giving you more details. DO NOT OFFER SOLUTIONS! Not yet. This is the tricky part. Your mission here is to get them to feel that you really understand their problem(s). If you are really good at this, you will get them to cry!

> *"Our department has been struggling with this for months, and if we don't fix it, we will not meet our target. There goes our bonus."*

3. Deliver your solution to the buyer's need.

Once you are convinced that they have become fatigued from describing their problem, then you have their tacit permission to describe your solution. Now they will be capable of hearing and understanding your recommendation, because they feel that you understand them. Don't believe me? Think about this. Imagine that you are in that little room at the doctor's office. You have been waiting for 55 minutes and no one has checked on you. Suddenly the door opens by three inches and a man in a white lab coat throws a small bottle of tablets at you, saying, "Take these—you will be fine." How would you feel? Most people would be thinking "Wait a minute, how could you possibly know what is wrong with me? You did not examine me, and I do not trust your diagnosis." This is the same feeling the buyer gets when you step in and blast them with your solution to their problem. They are feeling that you do not fully understand. You must take the time required to get the buyer to trust you and to feel understood.

> *"Seek first to understand, and then to be understood."*
> - Stephen Covey, 1989

Now it is your turn. Because you have done your homework, you can describe your solution in a rehearsed, concise way. You have been thinking about this for some time, so you know what to say. Be focused and careful not to ramble. Time is money! Address each of the concerns that the buyer described.

4. Wait for the buyer's decision to agree with you.

You have danced the dance. You broke the ice and convinced the buyer to describe their problem to the point of feeling understood. You then delivered your prescription, providing a remedy to each of the concerns they described, and now you must be quiet and wait. It is hard to stay quiet here, but it is essential. Give the buyer time to think. As you are silently waiting, start looking for signs of agreement.

> "Once they agree with your recommendation, say thank you, *and then run*!"

They may ask additional questions, and of course you have anticipated these questions and you have a clear, succinct answer for each. Sometimes you can "see the wheels turning in their mind." The important thing is that you wait for them to move forward in agreeing with you. You cannot rush this. Once they agree with your recommendation, say thank you, *and then run*! Don't hang around and risk becoming tangled in tangential discussions. You have accomplished your mission.

Can you see that the logic of your solution is only a small part of the overall exchange? Working together as a team requires good communication skills in all parties. Without successful communication, the perfect solution may never be implemented. Effective communication is one of the fundamental problems we face in business.

Donald Truss *is a recruiter of STEM professionals, and is the executive director of Students 2 Science, which provides middle and high school students with a "hands-on" chemistry laboratory experience. He may be contacted at DonaldTruss@SolidusServicesGroup.com or DonaldTruss@Students2Science.org.*

Visit us at SFN Booth 922 and ASCB Booth 417

UNDER WRAPS:
Cell Culture Overhaul

After 20 years, it was time for an update.

We've painstakingly
- redesigned
- expanded
- optimized

To be unwrapped soon!

SARSTEDT

800-257-5101 • customerservice@sarstedt.us • www.sarstedt.com

Unity Lab Services
Part of Thermo Fisher Scientific

HAVE FUN MAKING WORK, WORK FOR YOU!

By Dr. Patt Schwab, CSP

The illiterates of the future will not be those who cannot read or write. They will be those who cannot learn and relearn.- Alvin Toffler

It's always more efficient for a group to master new ideas, approaches, and technologies. Here are three quick ways to enjoy your colleagues, limber up your thinking, anticipate change, and make relearning enjoyable:

1. Create an iLc, or Intentional Learning Community

An iLC is like a flash mob of colleagues who come together to complete a fast, fun, coordinated activity, and then disperse. They are linked by a common interest or expertise. The difference is that an iLC can meet in person or online and its focus is a specific work or professional problem.

An iLC can also be a group where everyone has a different expertise to share at the appropriate time. My friend, Lee, works for a large charity organization. The youngest of ten siblings, she has always been fascinated by generational issues. Most of her staff are bored with the topic—except at fundraising time. That's when Lee updates them on generational issues the group should know about, in relation to their donor population and client base. She's delighted to share her expertise. The staff is delighted she has it!

2. Reverse brainstorming

When brainstorming topics about superior customer service, better employee morale, etc. becomes tiresome, reverse them! Challenge a group's creativity by brainstorming topics like:

- What can we do to provide really terrible customer service?
- In what ways can we undermine our lab's loyalty?
- How many ways can we lose the "Race to the Future?"

Groups have fun and produce much more creative lists. At the end, simply reverse the answers and the group has a list of powerful, fresh, solutions to the original problem.

3. Create a multipurpose link between your professional and personal interests

Pathology Associates Medical Labs, in Spokane, WA, is a large medical testing lab for physicians and hospitals. A few years ago, the company's very overweight CEO was diagnosed with Type 2 diabetes. He took action by substituting lunch three days a week for a walk around the grounds, and invited any staff who wanted to join him to do so. A small group did. It was called "Walking with the President." As they walked, they covered topics from current events to issues in the industry, projects staff were developing, lab equipment needed, and the like. Fast forward three years. There are 100 staff on these walks. The CEO was getting input from staff he never would have met before. Research and lab staff were connecting throughout the organization. The company was voted one of 100 best places to work in Washington state. PLUS: staff used measurably fewer sick days, a large group of them entered the local 12 K race, and the CEO lost 60 pounds!

I hope these models spark your thinking. To further inspire you, let me share a quote from Eric Hoffer: "In time of drastic change, it is the learners who inherit the future. Those who have finished learning find themselves equipped to live in a world that no longer exists."

Dr. Patt Schwab, *CSP, is an international speaker and writer who works with mid-level staff who want to improve their skills at managing others, managing change, and managing to have more fun. She may be reached by email at Pattschwab@aol.com or through www.FUNdamentallySpeaking.com*

LABCAST Be sure to attend Dr. Patt Schwab's Lab Manager Academy webinar, "Making Work Work for You" on Wednesday, December 3rd, or afterward at www.labmanager.com/work to watch the archived video.

because knowledge is power

SmartCapture — Business Intelligence for Smarter Decisions

SmartCapture™ technology empowers you to make smart laboratory decisions based on real instrument and equipment usage information. Finally, a solution that provides data across all makes and models.

The Power to Do More

Unity Lab Services' proven expertise combined with SmartCapture automatic data collection provides knowledge to:

- Balance instrument workload
- Identify redeployment opportunities
- Optimize instrument and equipment service levels

Enabling you to reduce downtime risk, cut capital expenditures and decrease equipment maintenance costs.

Ask how SmartCapture can drive cost savings, improve lab productivity and power smart lab decisions.

Contact us today
www.unitylabservices.com/smartcapture

Unity Lab Services
A Thermo Fisher Scientific Brand

THE POLITICS OF PERSONALITIES

By Mark A. Lanfear

Every workplace has at least one of them: the person who is smarter, the person who knows how to fix a problem better than you can, the person who is surely going to leave you in the dust on his or her way up.

Employees with this kind of self-regard and ambition may not always be a bad thing in the workplace. But in their most virulent and destructive form, these coworkers will often do what they need to do to succeed at the expense of others, clawing and scratching their way through the day and leaving their Machiavellian imprint on everything they touch.

There is ample clinical science and popular psychology surrounding the phenomenon of the Machiavellian personality. Some have called the trait akin to narcissism and psychopathy. Deriving its name from the Italian philosopher Niccolo Machiavelli, who wrote "The Prince," a book that seems to largely condone unscrupulous politics, the term "Machiavellian" in the workplace has a negative connotation and is often used to describe people who have no problem deceiving and manipulating others to get what they want.

In essence, the Machiavellian coworker is the person who may eventually stick that proverbial knife in your back.

In a lab setting, this behavior has the potential to be not only annoying and worrisome, but unethical. Take for instance a project in which both collaboration and confidentiality are key. If there is a bad apple in the bunch, you may not be able to trust him or her to hold that confidentiality as sacred. What if that coworker were prone to share details of the project with someone outside the lab who has a competing interest? What if that coworker were to take a project's findings somewhere else to further his or her career?

This type of scenario shows why, unfortunately, managers cannot avoid dealing with Machiavellian tendencies in the workplace. Ignoring such behavior certainly won't make it go away and could actually make everything worse for the entire team. They could get the message that management doesn't care about such behavior—or that treating people in such a way is an acceptable way of conducting business in that particular lab.

This is where the extremely difficult part of managing people comes in, especially with all their great—and unsavory—qualities tending to dovetail in very complex ways on the job. How can you consistently and successfully work through these daily political scenarios and battles? How can you encourage both a spirit of self-regard and innovation as well as one of working collaboratively, respectfully, and openly with the whole team?

If there is indeed a Machiavellian personality in your midst, again, as a manager, you must first recognize that the coworker exists. For managers, this can often be the most difficult part of the equation—recognizing that there is a problem. Unfortunately, we all tend to avoid problems, but managers do this at their peril, especially when it comes to an employee who could potentially undermine an entire staff or business.

Second, managers must recognize that there is no one tried-and-true method for tempering the personalities of others. This is where elusive "soft skills" must come into play, which will often dictate how to deal with employees on a case-by-case basis. In extreme cases where Machiavellian politics may indeed have the potential to tangibly threaten a project, it is crucial to take action quickly and to perhaps seek expert help from another manager, HR, or other trusted source to play an advisory role.

The worst-case scenario for any lab team is one in which bad behavior forces good employees to leave. In the science marketplace today, where finding and retaining good talent is always increasingly challenging, no manager wants to see that happen in the ranks.

Always take heed when a Machiavellian personality reveals itself in the workplace, for the sake of the health and well-being of everyone on the job.

***Mark Lanfear** is a global practice leader for the life science vertical at Kelly Services, a leader in providing workforce solutions. He has operated clinical trials around the world for almost two decades. In addition, Mark is a featured speaker at many life science industry conferences and a writer for life science periodicals. He can be reached at MARL773@kellyservices.com or 248-244-4361.*

THE NEW AVANTI JXN. THE FREEDOM OF ANYWHERE.

Already the leader in high-performance centrifuges, Avanti is yet again advancing your research and simplifying your workflow. With an enhanced LCD touch screen plus anywhere, anytime mobile access with MobileFuge, you're in control—in the lab and out.

Discover more at www.beckmancoultercentrifugation.com

© 2014 Beckman Coulter, Inc.

GOT GAS?

THE BEST SOURCES, SYSTEMS, AND DELIVERY METHODS

By Trevor Henderson

Analytical, research, and testing laboratories are becoming ubiquitous across a wide range of industries, from clinical and pharmacological research to consumer products and environmental analysis. In fact, virtually every product we encounter in our daily activities has likely been examined in an analytical lab at some point in its development. While there is great diversity in testing methods available and industries represented, these laboratories have one thing in common: a desire for precise and accurate results. As such, these labs often rely on high-purity carrier, combustion, and calibration gases.

When considering laboratory gas sources, there is growing pressure among lab managers to stay abreast of the requirements for the latest analytical equipment while also attempting to find solutions that optimize efficiency gains and minimize costs. When it comes to laboratory gas solutions, managing capital costs, safety, convenience, quality, and long-term returns are all considerations. If you are thinking of changing, updating, or modifying your current gas supply, consider that the overall success of your analytical workflow may depend on making the correct decision.

Supply options

Traditionally, most specialty gases have been supplied in compressed gas cylinders. These cylinders are typically 4 feet tall and weigh between 75 and 80 pounds with their contents pressurized to around 2,000 pounds per square inch (psi). While compressed cylinders are still by far the most commonly used method for supplying analytical gases, they do present a number of limitations. Specifically, they present risks to worker safety, require specific storage and handling equipment, and may have cylinder-to-cylinder quality variations that make sensitive analyses difficult. Although cylinders present some challenges for the analytical lab, they remain widely used and, coupled with engineered solutions for safety and regulation, still present an attractive choice for many labs.

Alternately, the adoption of point-of-use gas generators to produce a continuous supply of compressed gasses such as zero air, nitrogen and hydrogen has become popular for a broad range of instrumentation. As examples, zero air is used for liquid chromatography (LC) and gas chromatography with flame ionization detection (GC-FID); nitrogen is used with GC-FID, thermal analysis (TD), inductively coupled plasma spectrometry (ICP), Fourier transform infrared spectroscopy (FTIR), and liquid chromatography with mass spectrometry (LC-MS); and hydrogen is used both as a combustion gas for multiple purposes and as a carrier gas for gas chromatography (GC), where it offers increased speed, resolution, and sensitivity over helium (especially when used with FID). On-demand laboratory gas generators are available in a variety of configurations and output capacities suitable for supplying single or multiple instruments. However, while gas generators offer a number of safety, reliability, and convenience benefits to the user, these benefits come at the expense of higher initial capital cost, require ongoing maintenance, and may pose delivery pressure limitations in some situations.

A matter of choice

For many labs, previous commitments and constraints on capital investment may prohibit conversion to on-site gas generation. However, there are other reasons that a lab may choose a cylinder setup, and in many cases the benefits of cylinders may outweigh those of on-site gas generation. Regardless of what type of gas you are using, there are essentially two methods for setting up your gas cylinders: single, point-of-use cylinders and a multi-cylinder configuration. Choosing a suitable gas solution will depend largely on the size and demands of your particular lab.

Together, we can conserve helium by converting GCs to hydrogen carrier gas.

Helium is a non-renewable resource. There is a global shortage of helium that has caused prices to increase significantly. Many GC users are already switching to hydrogen as a carrier gas.

Hydrogen provides many advantages over helium including, higher resolution, shorter run times, longer column life, and cost savings. Many instrument manufacturers now provide resources to make switching carrier gas easier.

A hydrogen generator is a safe, convenient, and an inexpensive solution to storing hydrogen cylinders. Learn more at solutions.parker.com/conservehelium.

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker Balston

ENGINEERING YOUR SUCCESS.

solutions.parker.com/conservehelium

Point-of-use cylinders are generally best suited for smaller laboratories with single systems or a limited number of gas applications. In this setup, the cylinder is typically mounted to the wall in close proximity to the instrument it is serving. Close proximity to the device operator offers the advantage of easy monitoring and flow control if necessary. Additionally, there is less tendency for variations in pressure when the gas supply is close to the device in use. However, the main disadvantage of this setup is that your process must stop whenever a gas canister must be switched out, which may result in considerable instrument downtime.

"Choosing a suitable gas solution will largely depend on the size and demands of your particular lab."

For large labs, and those with high gas demands or several systems requiring a specific gas, a multi-cylinder configuration is often the best choice. In such systems, multiple cylinders are racked together and connected to manifolds with a switchover system. Gas supply is initiated from one end of the switchover system and is automatically switched as the primary source is depleted. This setup avoids many of the problems and much of the downtime associated with cylinder change-out, because the primary cylinder can be replaced while gas delivery continues from the secondary cylinder. Although multi-cylinder configurations with switchovers are less disruptive to laboratory operations, consider that they are more expensive to set up and may require a trained technician to handle switchovers and cylinder changes.

Another critical choice when setting up your gas delivery system is the selection of a suitable pressure regulator. Gas pressure regulators are used to reduce the pressure of gas supplied from a high-pressure canister to a level that can be safely used for instrument and equipment operation. There are two types of regulators to choose from: single-stage and two-stage. As their names suggest, single-stage regulators reduce cylinder pressure to the outlet pressure in one step, while two-stage regulators perform the same function in a two-step process. Selecting a regulator will depend largely on the type of application for which it is required.

If your system involves the supply of several instruments by a centralized gas supply, you may experience supply pressure variations, especially if automatic switchover manifolds are used. In this situation, a two-stage regulator with a narrow supply pressure effect should be used. Alternately, if you are using your gas for a short-duration calibration, a single-stage regulator with a wider supply pressure effect but a constant flow should be used.

Materiality is also a concern when selecting a gas regulator. Gas regulators must be constructed from materials that are suitable for the application in question. For general use, brass regulators with elastomeric diaphragms will be adequate for many applications. However, the use of stainless steel diaphragms will prevent adsorption of gases on the diaphragm and eliminate air diffusion. Such diaphragms are necessary for trace analyses where components may be adsorbed on an elastomeric diaphragm, or for applications such as GC, which can be affected by diffusion of atmospheric oxygen or outgassing of monomers and dimers from the elastomeric components

Kicking the canister

On-site generation of laboratory gas is becoming increasingly popular in many analytical labs by offering an increased level of safety and convenience as well as considerable long-term cost savings when compared to using high-pressure canisters. On-site gas generators typically operate at low pressures and store only small volumes of gas ($< 50\ cm^3$), greatly reducing risks associated with gas leaks such as asphyxiation or explosion. Further, once installed, a gas generator will provide continuous supply to a single or multiple instruments without the need to remove, replace, and reorder new canisters on a regular basis.

It is important to note that in some cases, gas generators may present delivery pressure limitations, resulting in problems for labs requiring high pressure gas or for labs that wish to serve multiple instruments from a single generator. In such situations, it is best to position the generator as close to the instrument as possible to avoid supply line pressure drops, and keep in mind that you may require multiple generators to meet the needs of your lab.

While on-site gas generators present a very attractive option in terms of convenience, be advised that they do require some maintenance to maintain optimum performance and reliability. Depending on the type of gas generator used, it may require replacement of filters or desiccant cartridges on a semiannual basis as well as replacement of valves, sensors, heaters, or thermocouplers

every couple of years. Complete knowledge of the maintenance requirements and the associated costs is important when purchasing a gas generator.

Gas generators present a very attractive argument in favor of safety. Their low storage volumes and low pressure minimize much of the risk associated with working with either flammable gases such as hydrogen, which can easily reach explosive levels from a small leak in a multi-cylinder line, or inert gases such as nitrogen, which can quickly displace breathable atmosphere, resulting in asphyxiation. Canisters may also present physical hazards when they are being moved or if they are inadvertently dropped. Given these risks, it is important to note that laboratories have one of the best safety records regarding compressed gas usage, and through proper use of engineered equipment and safety protocols, much of the risk can be mitigated.

Dollars and sense

If there is a major limitation to on-site gas generation, it is that it requires a relatively high initial capital investment. This is a consideration for many laboratories, and obtaining management buy-in is often key in making a switch from canister to on-site generation. However, most manufacturers estimate return on investment of less than one year, depending on your usage level. If your usage is high, accrued savings from canister purchase, delivery and handling may outweigh the initial investment in a matter of months. While cylinder gas is still an attractive alternative for many—if not most—labs, considering all the available options and alternatives as well as fully understanding the demands of your particular application will undoubtedly be critical for developing a gas delivery program that makes sense for your lab.

For more information on specialty gases and gas generators visit www.labmanager.com/gas-generators

***Trevor Henderson**, technology editor for* Lab Manager, *can be reached at thenderson@labmanager.com or by phone at 888-781-0328 x 291.*

SHEL LAB®

HIGH HEAT DECONTAMINATION CO2 INCUBATOR

"Unlike many competitors, SHEL LAB provides true sterilization with a unique 180° C decontamination cycle.

[...] **A strong advantage of SHEL LAB incubators is the unusually long warranty on the incubator (5 years) and IR sensor (7 years).**

No competitor offers such an excellent warranty."

-Dr. Roger Lippé, Professor at Université de Montréal
Montréal, Quebec

Fastest high heat cycle on the market
without having to remove critical cotmponents.

Most effective decontamination cycle available
Dry heat for two hours at 180°C.

Industry best warranty

- 5 years parts and labor in the USA
- 7 years on the IR sensor

SHEL LAB® www.shellab.com (800) 322-4897

Reginald Beer, PhD

ASK THE EXPERT

THE EMERGENCE OF DIGITAL PCR

by Tanuja Koppal, PhD

Reginald Beer, PhD, medical diagnostics initiative leader at Lawrence Livermore National Laboratory, talks to contributing editor Tanuja Koppal, PhD, about the trends and innovations in digital PCR. While touting the advantages of digital PCR, he explains that not every lab needs to invest in this technology. Lab managers should look closely at their samples and assays to determine if digital PCR is needed for their application.

Q: What is digital PCR and how does it compare to traditional PCR?

A: Digital PCR is really a limiting dilution PCR and involves partitioning a sample [of DNA or cDNA] into multiple reactors so that there are individual PCR reactions taking place in parallel. Traditional PCR has copies of a sample, all in one reaction vessel, whereas in digital PCR, each reactor has either a single copy or no copy of a target molecule—and that's really the fundamental difference. This allows Poisson modeling of the percentage of reactors that show amplification to accurately compute a starting sample titer.

Q: What is the biggest advantage, as well as the obvious limitation, of using digital PCR?

A: The biggest advantage of digital PCR is that it offers an extremely accurate quantitation of the copy number [of the target molecule] in your sample. The obvious limitation of partitioning your sample into different reactors is that you now have to observe and record tens of thousands, if not millions, of reactors instead of just a few cuvettes or samples.

Q: Does digital PCR involve completely different instrumentation and reagents compared to traditional PCR?

A: The reagents, such as enzymes, primers, and probes that you use for standard PCR are the same for digital PCR. However, there are some additional reagents that need to be used. For instance, for systems that use the droplets, you need emulsifying reagents, like oil, and some surfactants.

Q: Is digital PCR more suitable for certain applications than standard PCR?

A: The applications that are most suitable for digital PCR are obviously ones where titer or copy number quantitation is extremely important, or an application where you need to pick out one or a few copy numbers of target from a complex background. One application that comes to mind immediately is in oncology testing, where you are looking for early detection of mutation or metastasis. In digital PCR, the mutated DNA or RNA oligo is partitioned out into different reactors and hence becomes easier to detect as compared to traditional PCR, where it's part of a bulk, massively complex sample. Hence, the strongest and most obvious use for digital PCR right now is for medical applications. It's ideal for applications where knowing the titer is very important, such as in monitoring viral load present in very low copy numbers or in HIV testing.

Q: What are you working on in your lab related to digital PCR applications?

A: As a national lab we investigate many parallel threads and look for the right opportunity to put a new capability together. We wanted to develop technologies to detect certain rare targets in complex environmental samples, and our droplet digital PCR technology was developed with that goal in mind. Since then we have moved on to other broader applications. Currently we are looking at enriching microarrays using PCR and targeted laser-induced DNA desorption as one of our experimental platforms.

Q: Do you need extensive training to get started with digital PCR?

A: The next-generation PCR instruments are definitely more user friendly and do not need users with advanced degrees operating them. Vendors are working to provide

systems where the workflows are much simpler and easier from the user's perspective. There is no need for extensive training. A course that provides a good understanding of how digital PCR works and training from the vendor on how to use the instrument is all you should need. The software tools and data analysis packages that come with the instruments are also fairly standard, but users do need some training there to get started.

Q: Is sample preparation still a challenge in digital PCR, like it is in traditional PCR?

A: Sample prep is every bit as important as it used to be, and perhaps more so in digital PCR, since there is no room for error in quantitation. The controls and standards that are used in standard PCR are also equally important in digital PCR when you are initially validating your assay. However, digital PCR has certain advantages if you have inhibitors in your sample, because the inhibitors are partitioned and may not be present in reactors containing targeted oligos. Also, the systems use endpoint detection instead of real-time [detection], so if your amplification efficiency is lower than normal, a digital system may still detect it, while a bulk PCR reaction may not. Hence, sample prep with inhibitors is more robust on a digital PCR system. But sample prep remains important, along with experience in running and calibrating the assay and having primers that are appropriate for the target you are trying to amplify.

Q: Is the cost per sample significantly higher for digital PCR?

A: The cost per sample will certainly be higher with digital PCR because what was run in plastic disposable tubes is now partitioned into tens of thousands or millions of reactors, as droplets or in an array-based architecture. So you have additional substrates and reagents, you have to create emulsions using microfluidics, and you have to be able to read the optical signal after amplification in all those individual reactors. Hence, cost per sample is going to be higher, which is why people should invest in digital PCR only if they need the quantitation accuracy or need to detect a low-copy target in a complex background. If you don't need those capabilities, you probably don't need to make the investment unless the costs fall to qPCR levels.

Q: How should people evaluate the different systems that are currently available?

A: There are different types of digital systems out there and they should be evaluated based on your application. If you are looking for top-line performance with the highest statistics possible for applications requiring high titer accuracy, then take a look at the droplet-based systems that provide millions of reactors. There are also array-based systems that offer tens of thousands of reactors, which are sufficient for some medical and environmental modeling applications. Array-based systems tend to be easier and faster to load, so it really depends on the focus of the lab and what assays they are running.

Q: Where are the big gaps in this field? What needs to be improved upon?

A: By and large, the gaps are being worked on in terms of making systems user friendly and the workflow smoother. However, no matter how easy it gets, there is still more engagement and time needed making emulsions, performing additional steps, and taking more readings. Digital PCR is more expensive in terms of cost and labor. Another gap that is being filled is in assay development. More assays are being modified to the digital PCR format, and you will see people making that investment if the assay is for an application that requires accurate quantitation. There are a lot of good choices for digital PCR on the market today. It's a proven and user-friendly technology, and if they have a need for it, people should not be afraid to take a look.

Dr. Reginald Beer is the medical diagnostics initiative leader at Lawrence Livermore National Laboratory, where he develops lab-on-chip technologies for molecular diagnostics applications. He demonstrated the first real-time digital PCR in monodisperse droplets in 2007, and has developed additional sorting, trapping, and amplification tools to aid in droplet digital PCR. His research in digital PCR, on-chip miniaturization, and selective microarray dehybridization has led to several new technologies offering improved diagnostics capabilities.

A PREVENTIVE APPROACH

CREATING A SUCCESSFUL INJURY AND ILLNESS PREVENTION PROGRAM

by Vince McLeod

We believe in prevention—finding and fixing problems and hazards before employees are hurt. We also know that prevention programs are effective and do reduce workplace illnesses, injuries, and fatalities. Not only are injuries and illnesses decreased significantly, but many leading companies that have adopted the preventive approach are seeing a transformation in their safety culture. This shift is a positive one, leading to higher productivity, reduced worker turnover, and greater employee satisfaction. Want a successful health and safety program? Follow our guidelines for developing a solid, proactive approach to protecting your employees from potential hazards in the workplace.

"Hazard recognition, evaluation, and control is the heart of industrial hygiene practices and key to any health and safety program."

These essential elements represent a consensus of the opinions of health and safety professionals who participated in research conducted by the National Safety Council (NSC).[1] This compilation represents a framework for building an effective health and safety program. It also serves as a basis for performing a gap analysis on your existing approach. These elements are compatible with the Injury and Illness Prevention Plan (IIPP) promoted by OSHA[2] and are required in some states.

Instead of trying to reinvent an already good approach, we present the same program elements and same order as the NSC, with added commentary and explanation. In practice, these are all interrelated, and a single issue will generally overlap into many of the elements listed below.

Hazard recognition, evaluation, and control

This is where it all starts. Hazard recognition, evaluation, and control is the heart of industrial hygiene practices and key to any health and safety program. This step involves proactive hazard recognition in terms of environment (the surroundings of the workers), the people actually doing the work, equipment/materials used in the work process, and processes/practices themselves. A formal "job hazard analysis" assists with the process and is integral to many of the other elements listed below. In the lab, as part of the chemical hygiene plan, standard operating procedures (SOPs) are a product of this element. Once hazards have been identified and prioritized, they must be controlled. The generally accepted hierarchy of controls is elimination/substitution, engineering controls, personal protective equipment, and administrative controls.

Workplace design and engineering

We often see failure in this aspect when we are called in to solve a problem. Designing safety into a workplace is as important as designing in efficiency (and these often go hand in hand). Some of this is already accomplished by building codes (e.g., electrical standards, fire suppression, and egress requirements), but other aspects must be consciously addressed, such as ergonomics; ventilation, and

Refrigerated & Heating Circulators

ANOVA

Temperature Control Instruments for Lab and Industry

www.waterbaths.com

281-277-2202

SAFETY TIP

PROVIDE FIREPROOF CABINETS FOR STORAGE OF FLAMMABLE CHEMICALS

By James. A. Kaufman

Flammable liquids should be stored in fireproof cabinets. The NFPA provides recommendations in codes 45 and 30 for the quantities of materials that should be stored in labs in and out of these cabinets.

There is no federal requirement for these cabinets to be vented.

Assign a staff member to be responsible for oversight of the cabinet. This responsibility can include checking to make sure that containers are properly labeled, caps are tight, and the inventory on the cabinet door is up to date.

Source: Kaufman, James A., Laboratory Safety Guidelines - Expanded Edition, The Laboratory Safety Institute, www.labsafetyinstitute.org.

noise requirements for the anticipated work at hand; equipment and machine safeguarding; materials handling and storage; use of automated processes; and added reserve capacity.

Safety performance management

This can be thought of as the measurable actions of employees in relation to safety in their work. Performance measurement should reflect how employees (management as well as everyone else) are actually doing compared to applicable regulatory requirements and identified corporate goals. This should include a system of accountability for meeting those standards within their control.

Regulatory compliance management

Research laboratories must meet OSHA, EPA, DOT, and often accreditation or other agency specific standards. Noncompliance can have serious ramifications in terms of financial liability (penalties and fines), institutional reputation, and, in some cases, the ability to continue operations. It is very important to have a mechanism for staying informed and complying with existing regulations and standards. It is also very important to keep abreast of new or evolving regulations that will impact your operations. A self-assessment or an assessment conducted by an outside party is a good tool for determining the appropriate level of compliance.

Occupational health

The nature and scope of an occupational health program can vary widely from company to company. Often in research laboratory settings, one might expect preemployment health evaluations, periodic medical surveillance, injury protocols (including first aid, needle-stick, and blood-borne pathogens), maintenance of medical records, and coordination with the departments when work-related health and safety issues arise. One might typically find coordination of respiratory protection and hearing conservation programs within the occupational health component of a program.

Introducing the G7825 Standard
• Large chamber laboratory washer designed to provide high throughput at a competitive price
• Ideal for cleaning large varieties and volumes of glassware
• Our customized solution for the education market
✆800.991.9380 • proinfo@mieleusa.com • miele-pro.com
Miele
PROFESSIONAL

Information collection

Information is critical for proper decision making. Equally important as the collection of information is its subsequent management. We have seen situations where important information had been collected but never analyzed or distributed to those who needed it. Much of the safety and health information collected must be managed properly to maintain regulatory compliance.

Employee involvement

Employee involvement in all aspects of a safety and health program benefits both the employees and management. The frontline employees have experienced problems that might not otherwise be recognized by management. Employee involvement also serves as a bridge of understanding to the employer concerning health and safety issues.

> "It is also very important to keep abreast of new or evolving regulations that will impact your operations."

Motivation, behavior, and attitudes

The goal of this element is to change behavior and attitudes to promote a safer and healthier workplace. It places great value on the management team's visible leadership and support for changing unsafe behaviors, attitudes, and work processes. One additional benefit is that it reinforces the desired behaviors through positive recognition.

Training and orientation

Training can assume a variety of forms, from classroom-style to hands-on, from general concepts to task-specific. Besides the need for safety training from a regulatory standpoint, it is critical that employees know what to do to perform their jobs correctly and safely.

ANALYTICAL GAS SUPPLY PUZZLE?
SilcoNert™ 1020 Switchover
SilcoNert™ 1020 Regulators
IntelliSwitch II
AutoSwitch
Gas Cabinets
CONCOA HAS ALL THE PIECES
CONCOA offers all the components required to deliver gas for any analytical application. SilcoNert 1020 regulators, manifolds, and hoses boost performance and reduce costs in analysis of sulfur compounds in low concentrations. The universal IntelliSwitch supplies a seamless flow of argon to multiple ICP instruments from any combination of high pressure, cryogenic liquid cylinder, or bulk sources. Fully populated gas cabinets, emergency shut-off assemblies, and flashback arrestors ensure safe transition from helium to hydrogen for economical gas chromatography. All CONCOA products are completely manufactured, assembled, and tested in the United States.
FIND THE REST OF THE PIECES AT
WWW.CONCOA.COM
SilcoNert™ is a trademark of SilcoTek Co.

Organizational communications

Communication within the organization keeps employees informed of new and existing policies, procedures, lessons learned, and missions. Likewise, it provides avenues from the front line to upper management for consideration in the development and revision of those policies. A flow of information in both directions is needed for an effective health and safety program.

Management and control of external exposures

This might be considered incident or emergency planning. Plans need to be developed for emergencies such as severe weather, incidents stemming from contractor or "neighborhood incidents," and man-made issues such as the presence of protestors or activists.

Environmental management

Environmental management is a broad and complex enough issue that it requires a program of its own. Often there is overlap of duties and, as such, environmental management is grouped under the health and safety program umbrella. Issues from proper permitting to preventing potential environmental liability are considered under this heading.

> "It is critical that employees know what to do to perform their jobs correctly and safely."

Workplace planning and staffing

In providing a successful safety and health program, effective human resource management is vital. It includes the development of accurate job descriptions to take into consideration job duties (such as respirator use or hearing protection use, manual material handling, exposure to chemicals, etc.) that may trigger the need for preemployment evaluations and medical surveillance.

ELGA VEOLIA

In tune with your pure water needs

Introducing the pioneering PURELAB® Chorus range: innovation meets choice, a fresh new approach to the way you work.

Want to see more?
Visit www.elgalabwater.com/purelab-chorus

ELGA. Our innovation. Your choice.

Part of the world's leading water services company Veolia.

Now available through

VWR® | vwr.com
We Enable Science

Limiting exposures through administrative controls or other safety considerations (e.g., tasks requiring two people) and the development of safety rules would both be considered under this area.

Assessments, audits, and evaluations

This final set of tools provides a measure for how an organization is doing in terms of health and safety. These are used to monitor compliance behaviors and to provide a yardstick for measuring progress. A variety of tools are required to address these needs. These can be performed by in-house staff, by committees, as part of a job task, or with outside consultants. The assessment results serve as a springboard for improvement.

We have just skimmed the surface of the major components of a good IIPP. We hoped to provide you with a starting point for the review of your own program. Perhaps you can identify holes in that program or use this as a catalyst to move forward. We guarantee that it will help those you work with return home each night in as good a condition as when they arrived at work that morning.

"In providing a successful safety and health program, effective human resource management is vital."

References

1. *Nine Elements of a Successful Safety and Health Program*, John Czemiak & Don Ostrander, National Safety Council, 2005. http://shop.nsc.org/Sale-Products-Nine-Elements-of-a-Successful-S-H-System-P24.aspx.
2. *Injury and Illness Prevention Programs White Paper*, US Department of Labor, Occupational Safety and Health Administration, Washington, D.C., 2012 https://www.osha.gov/dsg/InjuryIllnessPreventionProgramsWhitePaper.html

Vince McLeod *is the founder and senior member of the Safety Guys and an industrial hygienist certified by the American Board of Industrial Hygiene. He currently serves as the senior industrial hygienist in the University of Florida's Environmental Health and Safety Division. He has 27 years of occupational health and safety experience at the University of Florida, and he specializes in conducting exposure assessments and health hazard evaluations for the university's 3,000-plus research laboratories.*

BioSpec introduces the
Mini-BeadBeater 24

The Mini-Beadbeater-24 disrupts microorganisms and tissue preparations with better than 95 percent efficiency. Nucleic acids and proteins are isolated with the highest possible yields. Cells are disrupted quickly and safely in the sealed 2 ml microvials containing small beads. No cleaning between samples is required. The apparatus has a small footprint and is essentially maintenance free.

- Uses proven, more efficient near horizontal vial shaking motion.
- 24 – 2.0ml microvials capacity with removable vial-holding cassette.
- Variable shaking speed:2000 - 3450 strokes/min.
- Digital 5 minute timer with auto reset.
- No imposed motor cool-down-time between each sample run.
- Best price.

BSP BIOSPEC PRODUCTS
P.O. Box 788 Bartlesville, OK 74005
800-617-3363
www.biospec.com

LABORATORY MILLS

ROUTINE UPKEEP KEEPS THEM GRINDING

by Angelo DePalma, PhD

Googling the term "bead mill" retrieves dozens of links to large, process-scale devices. Add the word "laboratory" to the search string, and most products are still industrial strength. That is changing, says Eric Clouser, a sales specialist at Omni International (Kennesaw, GA). "Laboratory bead milling, especially for small sample volumes, is a relatively new idea. A number of companies produce ball mills, but until recently the devices have been too large for laboratory use."

Like their much larger cousins, bench-scale mills employ beads of stainless steel, ceramic, or glass to reduce the volumes of sample particles. "It's an aggressive form of homogenization suitable for almost any sample," Clouser says. After milling, tubes are suitable for further manipulation such as extraction, reagent addition, and filtration.

Mills as cell disruptors

Because there is a wide range of marketed cell disruption technologies, one might not consider ball milling bacteria, yeast, or suspended animal cells due to their small size. Yet this form of size reduction, which releases cellular contents undamaged, is fast and efficient. "We sell an ultrasound homogenizer as well, but a bead mill is superior for cells," Clouser tells *Lab Manager*. He predicts that within a few years ball mills will replace traditional homogenizers, including rotor-stator, ultrasonic, and even pressure homogenizers, for many lab applications.

Ultrasound of microorganisms is slow, may chemically disrupt target analytes, and adds heat that can denature proteins and genes. Bead milling reduces the likelihood of losing sample through mechanical or thermal events. Since sample tubes are disposable, bead milling eliminates cross-contamination or artifacts due to improper cleaning of sonication heads or propeller blades. Both tubes and beads are intended for a single use.

"In the life sciences, shaking-type bead mills are superior to other types of mechanical disruption because the sample is securely enclosed within a small vial and the integrity of each sample is protected," says Tim Hopkins, president of Biospec Products (Bartlesville, OK). Compared with a French press or a mortar and pestle, bead milling processes much smaller volumes, down to 0.1 mL, which conserves samples and reagents. "You lose too much of your sample if you try to homogenize volumes in the microliter range in conventional homogenizers," Hopkins adds.

Care

Although milling is not terribly complex conceptually, adhering to good operating procedures is essential. "We too frequently learn that customers have bought a used mill but not the operator's manual, and they end up damaging the unit or cannot achieve their size-reduction goals because they don't understand the unit," says Greg Boyer, marketing manager at Hosokawa Micron Powder Systems (Summit, NJ).

Users should also inspect mills/grinders periodically for wear or damage. How frequently? "There's no blanket answer to that question," Boyer acknowledges. A pharmaceutical grinder might require cleaning several times per day to ensure sanitation, or it might need to be shut down in order to inspect for sample quality. By contrast, a unit grinding rock samples might be cleaned less frequently but checked for damage more often. Usage patterns also dictate more- or less-frequent inspection and cleaning practices, Boyer adds.

Purchase decisions

Economics and performance are the two main factors when purchasing milling/grinding equipment, according to Boyer. Customers know their samples and usually have a good idea of the extent of size reduction they require, but there is more than one way to skin this particular cat.

Potential purchasers should always test a mill before buying, to confirm in-spec particle characteristics. Top vendors are quite open about testing samples and advising customers. "Our application engineers have experience with most materials and can quickly identify

the right milling system," explains Boyer. He recommends submitting a few samples beforehand, which his colleagues will test to customer specifications with several possible mills—an air classification, universal, or hammer mill, for example. Hosokawa invites customers to its facility to discuss results in person with the firm's technical staff.

"We give customers options based on outcomes and performance," Boyer says. "One mill may be right if they're looking for high production rates and low energy costs, whereas a different mill might be suitable for ultrafine or coarse granulation." Boyer admits that at times, given a particular material and performance criteria, "we may not even offer the right type of equipment."

Buyers should avoid mill/grinder vendors that lack experience in their specific field. "A company known for pharmaceutical milling may not fully understand the requirements for foods," Boyer says. For example, regulations for processing drugs are quite stringent with respect to particle size, size distribution, and process temperatures. Over- or undermilling can be disastrous for realizing a product's key quality attributes.

Hopkins provides several tips on purchasing a high-capacity bead mill cell disruptor. Sample capacity (number, not volume) and cost are the first features to consider. Next comes vial orientation. Vials positioned horizontally with agitation in the same direction disrupt more efficiently than vials held vertically, thanks to greater shaking room within the mill. High shaking speeds and throw (distance the vials move during oscillation) are critical for optimal performance. Skimping on either parameter can lengthen disruption times by up to a factor of ten.

If your lab works with microplates, make sure the mill you purchase can handle deep-well versions that users can seal appropriately for the vigorous shaking that bead milling entails. "Not all microplates qualify," Hopkins warns. Several bead mill suppliers sell microvials with beads preinstalled. Although this can save the user some time, it increases disposable materials cost about tenfold. Furthermore, Hopkins says, there is nothing "magical" about the bead mix in precharged vials, and beads are easy to self-load.

Not all workflows require highly efficient ball mills. PCR preps can often get by on partial cell disruption, since the genes are amplified afterward. But proteomics investigators need all the material the sample holds, which is achievable only through 100 percent lysis.

Angelo DePalma *is a freelance writer living in Newton, NJ. You can reach him at angelo@adepalma.com.*

FOR ADDITIONAL RESOURCES ON LABORATORY MILLS , INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/MILLS-AND-GRINDERS

THE ULTIMATE
CRYOGENIC GRINDER

6870D
Freezer/Mill®

The 6870D Freezer/Mill® is a powerful cryogenic grinder with dual grinding and cooling chambers that pre-cool and grind samples simultaneously.

- Grinds tough plant and animal tissue, plastic, pharmaceuticals and bone to a fine powder in minutes.
- Grinding and Cooling chambers hold up to 200 grams (100 grams per vial).
- Touch screen control panel stores up to 10 grinding protocols.

SPEX® SamplePrep

WWW.SPEXSAMPLEPREP.COM

1-855-GET-SPEX

© SPEX SamplePrep 2014

HOMOGENIZERS

ADVANCED FEATURES MODERNIZE THIS ANCIENT TECHNOLOGY

by Mike May, PhD

Scientists use homogenizers in a long list of ways, including dispersing, emulsifying, cell lysis and extraction, milling, and more. These tools can homogenize a liquid and a solid, two different liquids, and other combinations of materials. Beyond the conventional uses of this technology, homogenizers keep getting used in new ways. For example, Kathrin Hielscher, marketing manager at Hielscher Ultrasonics in Teltow, Germany, says, "A very important sector is sonochemistry, where the influence of ultrasonic energy and the resulting shear forces can create unique results." Ongoing advances in research and development across a wide range of fields will surely propel even more applications of homogenizers.

To keep up with other technologies, homogenizers keep getting smarter. Hielscher explains, "The standards of lab homogenizers adapt more and more to the intelligence of industrial machinery. This means adding smart features such as browser control of the device, automatic data recording, automatic shutoff after a determined time or energy input, or the option of interval processing with defined pauses during the homogenization process." That kind of control allows far more sophisticated homogenization cycles.

One lab might also use the same homogenizer for multiple tasks. To do that, the device needs some flexibility. "For small-scale sample preparation in the analytical lab, customers ask frequently for multifunctional devices to fulfill demanding applications," Hielscher says. That makes flexibility a feature worth seeking when shopping for a new homogenizer, especially in labs that lack the budget or even the space for multiple devices.

In some instances, though, different applications will require specific forms of homogenizing. For instance, Jeffrey D. Whyte, product manager, molecular biology and radiochemicals, at MP Biomedicals (Santa Ana, CA), says that a bead-beating homogenizer works great for agricultural biosciences needs, such as extracting DNA from a parasite on a plant's roots, or for forensic applications, such as grinding bone samples or processing a bodily fluid on clothing.

Take a test run

It's hard to ensure that a homogenizer will do just what you need. So test it first. As Hielscher says, "Before buying a new homogenizer, it can be very helpful to test different types of homogenizers to compare the results that can be achieved with different homogenization tools. Especially demanding tasks—for example, in nanotechnology or biology—often cannot be fulfilled with a traditional mixing device and require a powerful homogenization tool."

"Customers ask frequently for multifunctional devices to fulfill demanding applications."

A user also needs to know how the process affects that sample. Because of that, a common question is whether homogenizing heats up the sample. According to Hielscher, "Although the homogenizing process—for example, by ultrasonication—is a mechanical, nonthermal mixing method, the processed liquid heats up. Based on the law of thermodynamics, the input of energy into a medium ends in heat finally." She adds, "The ultrasonic homogenizing method is a very energy-efficient means of homogenization, which means that 80 to 90 percent of the total energy input is converted into ultrasonic cavitation so that the input of thermal energy is kept low." Moreover, a cooling bath can be used to minimize any temperature change in a heat-sensitive sample. Even simpler, the process can be done in an on-and-off fashion to limit any heating.

In many cases, the speed of the process matters, which can be another reason to test a product before purchase. For instance, Whyte says, "Faster processing time increases the quality of the yield for nucleic acids and proteins because it gets them into the protective buffer much quicker."

Industrial advances

Some industries need particular features more than others do. For instance, Whyte says, "Big agribio and forensics process lots of samples, so they tend to use larger instruments, like ones that use 96-well plates or [are] even bigger." Conversely, some scientists use homogenizers for small batches. "There's a bit of a trend toward smaller, personal instruments that homogenize just one to three samples at a time," says Whyte. Also, Whyte mentions that his company even makes a battery-operated, single-sample device that can be taken to the field. This kind of portability really expands how and where a homogenizer can be used.

Making a better fit with a homogenizer and a specific industrial application often depends on the options for controlling the technology. It's easy to find a homogenizer that allows a wide range of options. However, according to Whyte, one new bead-beating device incorporates smart technology including a touchscreen-controlled microprocessor that comes with dozens of recommended programs for specific uses, such as the sample being processed. "These programs can cut down the optimization time," says Whyte. "With any new application, you might have to tweak a program here or there, but the program will get you very close to the optimum processing."

In a regulated environment, such as the pharmaceutical industry, other features make life in the lab easier. Just adding a USB port, for instance, makes it far easier to keep track of the processing of a sample, allowing memory-stored assay data, including when and how the sample was homogenized, to be downloaded to a computer.

Some applications can be very specific. For instance, at Sequip in Düsseldorf, Germany, Friedel H. Schwartz, chief technology officer, describes using a homogenizer "inside a beaker inside a bypass line during the pumping in a stream of drilling mud." He adds that they "use the same technology for process and lab applications in combination with Sequip's shockproof and vibration-proof sensor technology."

These examples reveal only some of the breadth of science and technology that require a homogenizer. So the only real solution to matching the best technology to the technique at hand requires lots of product research and talks with colleagues and company experts, plus a few test runs with various products.

***Mike May** is a freelance writer and editor living in Ohio. You may reach him at mike@techtyper.com.*

FOR ADDITIONAL RESOURCES ON HOMOGENIZERS, INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/HOMOGENIZERS

USERS VALUE APPLICATION SPECIFICITY

by Angelo DePalma, PhD

Chromatographers often need to balance the convenience of universal-use columns against the sensitivity and resolution of specialized columns. "Where labs may at one time have employed a nonpolar, all-purpose column, they now seek columns engineered for chemical families or even specific methods," says Timothy Anderson, GC products manager at Phenomenex (Torrance, CA).

Phenomenex, for example, recently introduced a column specifically for chlorinated pesticides, which joins similar products from Agilent, Restek, and Supelco (Sigma Aldrich). Polyaromatic hydrocarbons (PAHs) are another application-specific favorite. PAHs are produced during manufacturing processes involving high heat. European regulators specify allowable PAH levels in food and consumer products. European and U.S. standards differ substantially enough that those markets are best served by different method-specific columns.

Column manufacturers are also addressing columns' chemical activity, which arises from incomplete coverage of base silica with the stationary phase. Active sites promote undesirable chemical interactions or analyte breakdown. Capping free Si-OH bonds produces lighter coatings, shorter analyte residency times, and sharper peaks.

Purpose-driven tests

Application specificity extends to tests as well as to columns. Chris English, lab manager at Restek (Bellefonte, PA), describes tests as "the specific things customers are analyzing." Column companies create application-specific tests or methods so that when customers receive a column they can count on it.

One example is simulated distillation, a high-temperature analysis common in the petroleum industry. The test allows labs to recreate conditions and results of a lengthy distillation through a much shorter, high-temperature (up to 430°C) column run.

"Historically, many manufacturers supplied the column but did not actually test it to 430°C, English says. "Without running up the temperature, there's no way to know if the column can handle those conditions or what the bleed will look like."

Other top column companies have jumped on the test/column bandwagon. Agilent and Phenomenex, for example, provide specific tests for EPA method 8270 for semivolatile organic compounds and even offer an 8270-specific test mix as a reference standard.

A robust test includes components that do not easily separate, including contaminants or matrix. "We include the most difficult probes in our test mix," English says. "If a column can separate those, then the customer is assured it will work on all the others."

A test mix extends to column conditions as well as analytes and provides a rough estimation of column life. "End users need GC columns that can cope with actual separation conditions," says Cristian Cojocariu, senior applications specialist at Thermo Fisher Scientific (Runcorn, UK). Columns that last longer ultimately lead to improved productivity and provide superior return on investment.

"We use standards to test columns for critical isomers in the 8270 semivolatile mix, for example," says Cojocariu. "We also test for ruggedness using difficult matrix samples spiked with target analytes like pesticides, and we test columns as part of a workflow such as extraction, detection, and quantification of pesticides in difficult matrices."

Column care

GC column performance depends on how the analyst cares for it, beginning from when it is taken out of the box. Cojocariu provides the following best practices:

- Never exceed the recommended maximum column temperature (both isothermal and programmed).
- Do not inject highly acidic or very alkaline samples.
- Store columns under oxygen- and water-free conditions, as even tiny amounts of oxygen and moisture can damage the stationary phase. To achieve this, install one end in the GC inlet, leaving the other end free and uncapped inside the GC. Start the carrier gas flow, set the GC oven temperature low, and run for at least 30 minutes.
- Appropriate column conditioning ensures good performance and enhances column shelf life. Condition columns at 10-20°C above maximum operating temperature to allow column bleed to stabilize. This takes up to two hours, sometimes longer, depending on column dimensions, stationary phase properties, and film thickness.

Many GC problems arise from non-eluting components. Anderson advises planning a periodic bake-out to expel "leftovers." Phenomenex has developed high-temperature versions of several of its phases for this very purpose to allow regeneration at 430°C. Anderson also suggests using a guard column to trap matrix and non-volatiles, covering the ends of stored columns with rubber septa, and periodically checking injector linings for non-volatiles.

***Angelo DePalma** is a freelance writer living in Newton, NJ. You can reach him at angelo@adepalma.com.*

LABORATORY WASHERS

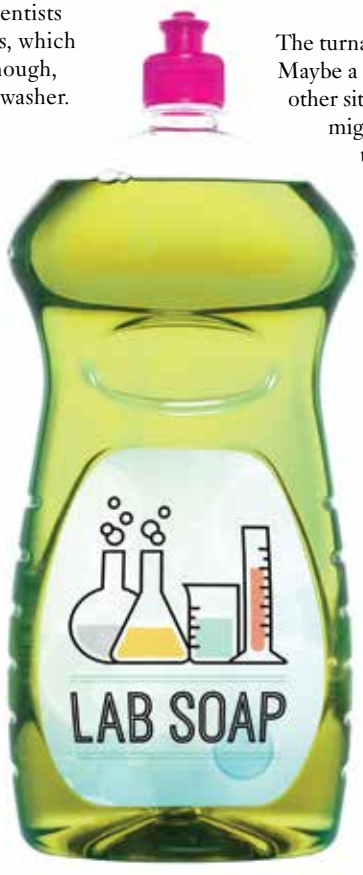
NEW LABWARE AND TECHNIQUES DRIVE THE NEED FOR NEW CLEANING REGIMENS

by Mike May, PhD

Choosing the right lab washer depends entirely on what needs to be cleaned and why. Both the labware and the washer features come into play, and these change with advances in technology. "Today, more of the labware being used is difficult to wash," says Odette Nolan, product manager at Labconco (Kansas City, MO). "Many scientists are also moving toward reusable supplies, which are greener and cost less." Doing that, though, might require more throughput in a lab washer. Likewise, the labware's composition changes. For instance, Paul Miller, national sales manager for Miele Professional (Princeton, NJ), says, "With the increasing use of plastics, we adjusted our wash cycle to accommodate that. You can't use as high a heat to clean it, so you add a better detergent."

To make a lab washer work well over time requires features that provide flexibility. For example, Nolan says, "Our washers come with seven preset factory cycles and a couple that are open for a user to set." Some labware, for instance, might have dried-on residue that needs a longer steam cycle to get clean; other labware might need more heat. A scientist can create custom cycles for such situations. A washer manufacturer can also help a scientist develop the right washing procedure. Miller says, "We work with clients who send in something to wash, and we design custom cycles for it." This includes wash cycles, detergents, and accessories.

A staff member at the biological nanostructures lab in the California NanoSystems Institute at the University of California, Santa Barbara, wants a glassware washer that is "user friendly and easy to run and operate" and that lets you "select preprogrammed wash cycles or program customized wash cycles to facilitate your individual requirement."



Personal touches

Beyond different cycles, a washer also needs various racks. "There's not a universal rack that fits everything," Nolan explains. "For example, we have a rack that provides direct inject washing and drying for up to 150 test tubes." Some new racks and accessories might not work with older lab washers.

The turnaround time should also be considered. Maybe a task requires washing and drying. In other situations, washing and using a drip rack might make sense. The volume also impacts turnaround. Some situations call for a large, central washing facility with very high throughput, but many scientists prefer washing their own labware, and that calls for a point-of-use washer.

Getting labware clean depends on the washer and the detergent. As Miller says, "We have nine different detergents that are matched to what they are trying to clean." The detergent is also matched with a neutralizer to ensure that the rinse water legally can go into the water supply.

How a lab washer gets used also matters. For example, it should be run only with water-saving devices and when full, according to the sustainability program at the University of California, San Francisco.

All of the parts—from the washer and racks to the cycles and detergents—determine how clean your labware comes out.

***Mike May** is a freelance writer and editor living in Ohio. You may reach him at mike@techtyper.com.*

FOR ADDITIONAL RESOURCES ON LABORATORY WASHERS, INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/LAB-WASHERS

DISCOVERING THE SECRETS OF BRAIN DEVELOPMENT—IN A DISH

PASSION AND PERSISTENCE PUSH THIS LAB FORWARD AS IT SEARCHES FOR THE CAUSE OF AUTISM

by Rachel Muenz

Many studies suggest that toxins in the environment may be a cause of autism, affecting a mother's unborn child as it develops. However, proving this for certain is difficult, as it is something that cannot be tested directly.

"You can't feed a toxin to a pregnant woman and say to her, 'Hey, we just want to give you these toxins and see what happens to your child.' Obviously that can never happen," says Dr. Chris Fasano, a principal investigator (PI) at the Neural Stem Cell Institute (NSCI) in Rensselaer, New York. "But with stem cell technology, we can model [that] in a dish."

Fasano's lab at the NSCI uses stem cells to gain a better understanding of how the human brain develops, even in the earliest stages, aiming to discover what causes autism. "Once we understand that process, we can try to understand what happens when things go wrong," he says.

As a whole, the NSCI is focused on using stem cells to understand and create new therapies for nervous system diseases, including blinding disorders such as macular degeneration and neurodegenerative diseases such as Parkinson's and Alzheimer's.

Fasano's roughly 1,000-square-foot lab is staffed by five employees, most of whom are students working toward their master's degrees or doctorates.

"When the majority of your lab [staff are] students, it's important as a manager or principal investigator … to remember that the primary [goals] of that relationship [are] education and training," Fasano says. He adds that stem cell science is a very competitive field and students tend to want to move quickly and publish as many papers as possible. As a primary investigator, he says, while it would look good for the lab to have students publish often, it's more important that they are properly trained in basic science. "I think that's a challenge nowadays in a very competitive environment where you want to push your students to produce but you have to be cautious because they are students and they are learning and you have to make sure that they are properly trained first and foremost," he says.

In his lab, that training starts with basic cell culture techniques, including aseptic technique and how to grow and maintain cells. Students also learn a bit of molecular biology, dealing with DNA, cloning, polymerase chain reactions (PCRs), immunochemistry, and staining cells with different antibodies.

"They all receive a similar level of training," says Fasano, who has been at the NSCI for about four years and is also director of research and development at the institute. "Some students might, for their project, have a specific application that they have to learn … but

RETSCH CRYOMILL

The CryoMill is tailored for cryogenic grinding. The grinding jar is continually cooled with liquid nitrogen from the integrated cooling system before and during the grinding process. Thus the sample is embrittled and volatile components are preserved. The liquid nitrogen circulates through the system and is continually replenished from an Autofill system in the exact amount which is required to keep the temperature at -196 °C.

Typical sample materials include frozen yeast cells ('noodles'), bones, teeth, hair, mammalian tissue, plant materials, grains, oilseeds, tablets, and API.

www.retsch.com/cryomill

RETSCH MIXER MILL MM 400

The mixer mill MM 400 is a compact versatile bench-top unit, which has been developed specially for **dry, wet and cryogenic grinding** of small amounts of sample.

It can mix and homogenize **powders and suspensions in only a few seconds**. It is also perfectly suitable for the **disruption of biological cells** as well as for **DNA/RNA extraction**. With its **high performance and great flexibility** the MM 400 is a unique product in the market.

Typical sample materials include frozen yeast cells ('noodles'), bones, teeth, hair, mammalian tissue, plant materials, grains, oilseeds, tablets, and API.

www.retsch.com/mm400

RETSCH HIGH ENERGY BALL MILL E_{MAX}

The E_{max} is an entirely new type of ball mill for high energy milling. The unique combination of high friction and impact results in extremely fine particles within the shortest amount of time. The high energy input is a result of an **unrivaled speed of 2000 min^{-1}** and the **optimized jar design**. Thanks to the revolutionary cooling system with water, the high energy input is effectively used for the grinding process without overheating the sample. Due to the special grinding jar geometry, the sample is thoroughly mixed which results in a narrow particle size distribution.

Typical sample materials include alloys, cement clinker, ceramics, chemical products, coal, coke, fibres, glass, gypsum, metal oxides, minerals, ores, paper, pigments, polymers, quartz, slag, soils, waste samples.

www.retsch.com/emax

SCIENCE FOR SOLIDS

VERDER scientific

The VERDER SCIENTIFIC Division of the VERDER Group is setting standards in high-tech scientific equipment for **quality control, research and development.** The fields of activity cover sample preparation of solids and analyzing technology.

The VERDER SCIENTIFIC Division unites the leading manufacturing companies CARBOLITE, ELTRA, GERO, RETSCH and RETSCH TECHNOLOGY.

www.verder-scientific.com

Mills, Grinders & Sieve Shakers

RETSCH®

Solutions in Milling & Sieving

part of VERDER scientific

If you are looking for a complete line of products for sample preparation and particle analysis, look no further than RETSCH.

- **Mills and grinders for all solid sample types**
- **Widest range of sieve shakers in the market**
- **Fast, reproducible results every time**

1-866-473-8724

www.retsch.com

everybody gets a fairly thorough cell training course and basic molecular analysis skills like running a DNA gel and doing a PCR."

Those skills help staff deal with three to four main projects at any one time, along with a number of side projects. "All are part of a common goal," Fasano explains. "There might be four projects that are different, but they're all centered upon trying to understand something in the realm of human brain development."

Balancing his staff's individual needs while also promoting teamwork is another management challenge Fasano faces in his lab.

"It's like I have a bunch of kids," he says. "You want to empower them with a sense of individuality; you want to give them their own project that they feel is theirs, but at the same time you want them to collaborate and work with their labmates because they are there for a common goal."

The manager's chair

Fasano says one of the most difficult parts of transitioning to a lab management position is learning how to manage people successfully.

"When you receive a PhD, in your doctoral training nobody trains you on how to manage anyone. It's not part of grad school," he says. "There's no class on management, no one's coming in there to teach you how to run a business. It's purely science."

Those skills come through experience, but having a mentor is something that Fasano says helped him a lot when he became a manager.

"Having a mentor in someone who's been managing a lab or has been in a company for a while to talk to and ask their advice on how they did or didn't do it successfully really helps," he says. "I've been lucky to have mentors

1. Former NSCI research scientists Dr. Timothy Blenkinsop and Dr. Barbara Corneo. **2.** Dr. Christopher Fasano, NSCI principal investigator / director of research and development. **3.** Former NSCI postdoctoral fellow Sumitra Sengupta, PhD. She joined Dr. Sally Temple to study how the timing of different types of neuronal cell generation is orchestrated during development and aging and to understand the role of the stem cell niche in regulating cortical function. **4.** Qingjie Wang, PhD, postdoctoral fellow at NSCI. His current project aims to reprogram human retina pigment epithelial cells towards neural retina lineage, including photoreceptors.

for my PhD and for my postdoc who've been great in giving me advice for how to successfully manage."

He says the most important ways he motivates his staff are through creating a positive work environment and choosing the right people who are willing to work hard as a team.

"You have to bring people into your lab [who] are self-motivated and really want to push things forward," Fasano explains. "You can teach anyone how to do an experiment, but you can't teach someone how to be motivated."

He adds that he works to create a good environment for staff by being passionate and interested in the work they are doing.

"In science, 90 percent of the time experiments don't work," he says. "Ninety percent of the time your grants don't get funded. So as a manager, my job is to always be positive, to always keep the morale up by trying to inspire them and say, 'Your work matters. Your data really is going to make a difference.' That creates an environment where people are much more upbeat."

As PI, Fasano is in the lab about two to five times each day. In an average day, staff will feed their cells, analyze them, chat with Fasano about their latest data, and analyze that data.

"I like to sit down and have a dialogue with all my students and techs," he says. "I like to get them to think, get them to ask questions. If they have an idea, I want them to tell me what it is and I want them to tell me why they think it's a valid idea."

Apart from the management challenges, Fasano's lab faces many of the same issues other labs are facing—running a lab on reduced funding and disappearing grants. He says passion and persistence are the keys to overcoming such negatives.

"If you're going to be a manager in this lab world, whether you're going into industry or academia, you have to have a tough skin and a tough stomach," he says. "Your passion for it has to be so strong that in the face of many critics, you're going to keep going. A lot of people say that science is just not viable as a long-term career anymore. I disagree with that. I think it just takes the right person. You have to keep going and keep trucking through, and eventually your ideas will pan out."

For Fasano, the positives of the job are also similar to those of many other managers—having the opportunity to learn and do something new each day, doing challenging work, and working with young scientists.

"My role in this as a manager and as an investigator is not just to teach them science but also to be a mentor to them in their career and their life at this stage," he says. "I need to establish relationships with them and get to know them as people and help guide them through this stage of their life and onto the next. That involves a lot of responsibility, and it's great to work with really smart, young people."

Getting technical

On the technology side of things, Fasano says reagents are especially important in stem cell culture work, so much so that NSCI created its own reagent company called StemCulture so that it would have full oversight of the quality control process.

"When we grow cells, especially stem cells, they require a lot of care," he explains. "They're very sensitive, and they require a daily cell media feed, so you have to come in every day and feed them. That's really annoying because it's very tedious." He adds that if you get a bad

SEPARATING OURSELVES 90° FROM THE COMPETITION
All blood tubes at up to 5,000g, smaller than a toaster oven.
Introducing the Hettich EBA 280 tabletop centrifuge.
→ Learn more by visiting: www.hettweb.com/laboratory
Hettich
LAB TECHNOLOGY

reagent in cell culture, that can destroy a lab's cells for months, taking down its whole process as well as team morale.

To solve this issue, StemCulture created a growth factor product called StemBeads, essentially a time-release stem cell food.

"You just add it to your dish and it will feed your cells for you, so we don't have to constantly feed cells every day," says Fasano, who's also chief operating officer of StemCulture. "In a way, we've created a management tool for cells. We've created a way to manage cells less intensively. It allows the students and the postdocs to focus on more important things."

His lab also uses a lot of high-throughput RNA sequencing technology in order to better understand human brain development from start to finish. That technology "looks at all the genes in our genome at static points, and then we can decode that to get an idea of what genes go up and what genes go down as the brain develops," Fasano says. "Then we compare that to samples from autistic patients to see how those gene changes are now different."

Induced pluripotent stem cell technology (iPS) plays a strong role in the work of Fasano's lab as well, allowing researchers to "take a sample of somebody's skin and reconvert that all the way back to an embryonic stem cell," he explains. "This allows us to generate stem cell lines from autistic patients that we can then turn into brain cells and see how that went wrong." The combination of those technologies gives the lab a powerful model to understand how the human genome changes in people with autism.

MAIN TECHNOLOGIES USED IN THE LAB:

- StemBead growth factors
- High-throughput RNA sequencing technology
- Induced pluripotent stem cell technology

However, the two technologies are not without their difficulties. With iPS, there is a lot of variation each time the lab makes a cell line, so they have to use many experimental controls to account for that variability, while with RNA sequencing the challenge is making sense of the huge amount of data gathered.

"You really need the help of computer scientists and mathematicians to help you decode that to have it make sense," Fasano says of that data. "As biologists, we're not trained to do that, so you have to be interdisciplinary. You have to work with people outside your field to make sense of the data you're getting."

Overall, new technologies, including cell culture kits, are making it easier to grow cells better and more efficiently, he says. Admitting he may be biased, he says the StemBeads technology has really helped, as researchers have gone from needing to feed cells every day, even on weekends, to two or three times a week.

"It's important to be in the lab, but it's important to be out of the lab," he says. "You want to be dedicated, but you need some time to yourself. This kind of advance has allowed that to happen without sacrificing quality of cells."

He says StemCulture aims to grow the StemBeads product line, and he also hopes to grow his own lab, get more funding, and add some postdoctoral fellows to his staff to offer extra guidance and support for the grad students. All that will help them continue their promising work.

"The fact that we can now take an everyday-occurring toxin and ask basic questions like 'What does it do to early brain development? How does it affect the genes that are changing during what would be the equivalent to pregnancy [in a culture dish]?'—it's really exciting, and we think there's going to be a lot of cool data there that's going to elucidate [autism] and have a really positive effect on the general health of people going forward," Fasano says.

Rachel Muenz, *assistant editor for* Lab Manager, *can be reached at rachelm@labmanager.com or by phone at 888-781-0328 x233.*

ARE YOU IN THE MARKET FOR A... MICROPLATE HANDLER?

Microplate handlers are specialized robotic devices that transfer microtiter plates in three dimensional space from one location within a workflow to another. The "locations" are actually operations such as solvent addition (through liquid handling), aspiration, heating, shaking, incubation, washing, reading, and storage.

Types of microplate handler(s) used by survey respondents

Microplate reader	37%
Microplate centrifuge	20%
Microplate washer	14%
Microplate stacker	12%
Microplate sealer	8%
Microplate labeler	5%
Other	5%

Top 5 microplate handler applications as reported by survey respondents

Biotechnology	27%
Clinical / diagnostics	23%
Pharmaceutical / medicine	18%
Education, research	11%
Environmental	6%

Nearly 31% of respondents plan on purchasing a microplate handler in the next year. The budgets for these purchases are as follows.

Less than $1,000	8%
$1,000 - $2,000	15%
$2,000 - $4,000	19%
$4,000 - $8,000	8%
$8,000 - $16,000	19%
$16,000+	31%

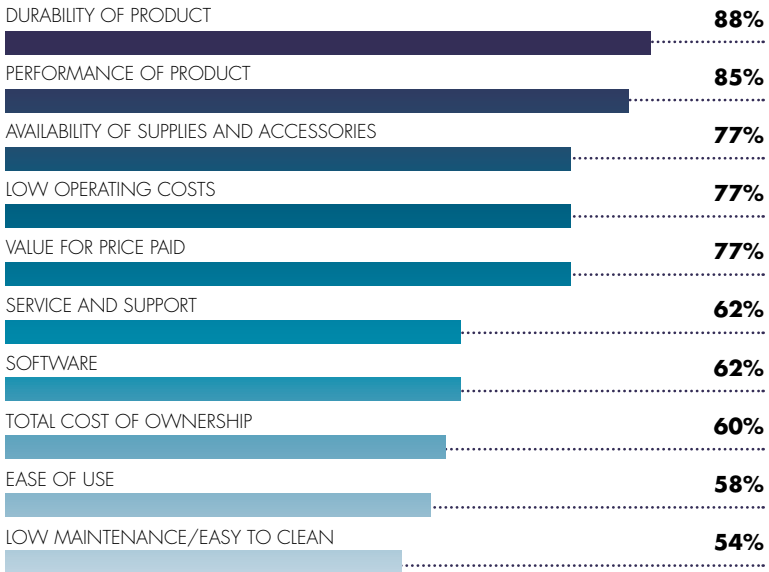
TOP 6 QUESTIONS

You Should Ask When Buying a Microplate Handler.

1. How many plates and plate types can the handler accommodate? An ANSI-compatible handler provides increased flexibility for those using multiple plate densities (ex. 96-, 384-, 1536-well) or low-volume plates, and interchangeable plate stacks accommodate varying throughput requirements.
2. What is the transfer speed? Transfer speed is especially important for increased throughput. Adding a dual plate carrier keeps two plates in process, thus further increasing assay efficiency.
3. Can the handler operate in portrait and landscape configurations? A rotational gripper option optimizes positioning of the microplate handler with its mating instrument, thus improving flexibility and efficient operation.
4. Does the handler fit into a hood or biosafety cabinet? Placing a microplate handler within a hood or biosafety cabinet allows users to maintain personal safety and protect samples.
5. Is the handler compatible with a wide variety of other instruments?
6. Does it come with a barcode reader for easy microplate identification? Barcode scanning is especially useful for increased throughput.

TOP 10 FEATURES/FACTORS

respondents look for when purchasing a microplate handler.


DURABILITY OF PRODUCT 88%
PERFORMANCE OF PRODUCT 85%
AVAILABILITY OF SUPPLIES AND ACCESSORIES 77%
LOW OPERATING COSTS 77%
VALUE FOR PRICE PAID 77%
SERVICE AND SUPPORT 62%
SOFTWARE 62%
TOTAL COST OF OWNERSHIP 60%
EASE OF USE 58%
LOW MAINTENANCE/EASY TO CLEAN 54%

For more information on microplate handlers, including useful articles and a list of manufacturers, visit www.labmanager.com/microplate-tech

ARE YOU IN THE MARKET FOR A... BIOLOGICAL SAFETY CABINET?

Biological safety cabinets (BSCs) are enclosures that protect users and the environment from biohazards by removing particulates and aerosolized pathogens from the work area through HEPA filtration, then recirculate or exhaust the purified air, hence, cleansing the workspace air.

Types of biological safety cabinet used by survey respondents:

Class I Biological Safety Cabinet	16%
Class II Biological Safety Cabinet	78%
Class III Biological Safety Cabinet	4%
Other	3%

Applications performed by survey respondents within their BSCs:

Cell / tissue culture	28%
Microbiology plating / specimens	21%
Pathogen handling	13%
PCR/qPCR	10%
Sample and reagent storage	9%
Mycology	5%
Gross dissection	5%
Laboratory animal handling	5%
Other (please specify):	3%

Nearly 24% of respondents plan on purchasing a BSC in the next year. The reasons for these purchases are as follows:

Replacement of aging biosafety cabinet	36%
Addition to existing systems, increase capacity	31%
Setting up a new lab	20%
First time purchase of a biosafety cabinet	9%
Other	4%

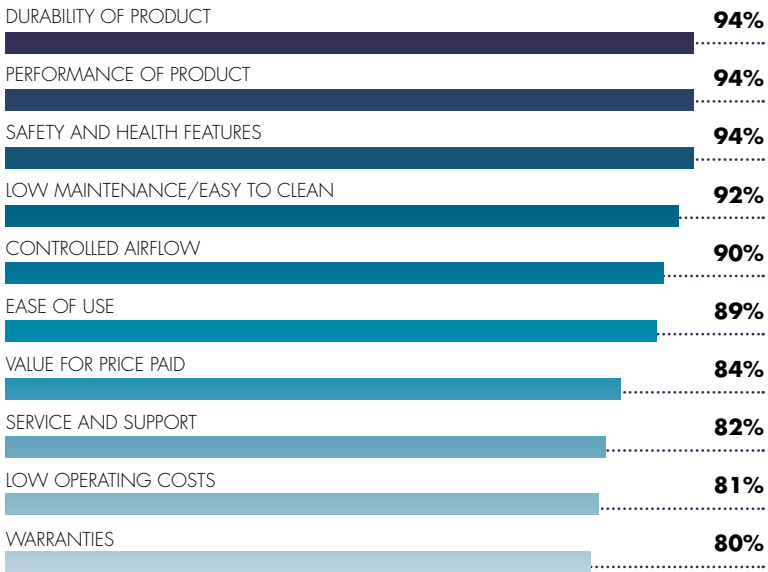
TOP 5 QUESTIONS

You Should Ask When Buying a Biological Safety Cabinet

1. Do the samples/specimens/cultures need to be protected from environmental particulates? Answering this question determines what type of BSC you require.
2. Are chemicals involved in your application? Hazardous (toxic or volatile) vapors are not filtered by the HEPA/ ULPA filters found in BSCs. Different BSC designs are available.
3. What are your size limits? Know what the maximum space allotment is so that you don't end up with equipment that is too big for your lab, or so small that you can't work.
4. Does your procedure require modifications to the equipment that are uncommon? BSCs should be built to an appropriate standard and listed by a testing agency. Some modifications can lead to the equipment being unsafe; reputable manufacturers will not provide such alterations.
5. Cost is always a concern. Avoid looking at the sticker price of a BSC; inquire instead about the lifetime cost of each BSC. This includes energy savings, service life, and a proven product track record.

TOP 10 FEATURES/FACTORS

respondents look for when purchasing a BSC


DURABILITY OF PRODUCT 94%
PERFORMANCE OF PRODUCT 94%
SAFETY AND HEALTH FEATURES 94%
LOW MAINTENANCE/EASY TO CLEAN 92%
CONTROLLED AIRFLOW 90%
EASE OF USE 89%
VALUE FOR PRICE PAID 84%
SERVICE AND SUPPORT 82%
LOW OPERATING COSTS 81%
WARRANTIES 80%

For more information on biological safety cabinets, including useful articles and a list of manufacturers, visit www.labmanager.com/biosafety-cabinets

Thermo SCIENTIFIC

protection

With **Thermo Scientific biological safety cabinets,** the certified performance and protection you get on Day 1 stays with you every day. Not true with ordinary cabinets. The difference is our design: SmartFlow™ technology features dual-DC motors to automatically balance the cabinet inflow and downflow air velocities in real time – even as the filters load. That means exceptional user and sample protection you never have to think about. Plus, our Digital Airflow Verification (DAVe) alarm signals any out-of-spec conditions, for added assurance. With our proven reliability, ergonomics and energy efficiency, the ideal choice is the one you can trust completely. And not just on Day 1.

that never takes a day off

• drive discovery at www.thermoscientific.com/bsc

© 2014 Thermo Fisher Scientific Inc. All rights reserved.

Herasafe KS Biological Safety Cabinet
Ultimate protection, comfort and performance

1300 Series Biological Safety Cabinet
Exceptional efficiency, safety and value

Heraguard ECO* Clean Bench
High performance with optimized efficiency, sterility and functionality

* Ideal when sample protection is required. Due to DC motors, Heraguard ECO clean benches use less energy to operate so there is less heat emitted into the lab.
Based on data from internal testing and The University of Michigan field study, published in American Biotechnology Laboratory

PURIFIER® AXIOM™ MAKES CLASS II BIOSAFETY CABINET SELECTION EASY

By Brian Garrett, Product Manager, Labconco Corporation

Ask any life science laboratory employee working in microbiology and they will tell you how confusing and frustrating it is to select a new biosafety cabinet (BSC) for the lab. Do I need a Class I or a Class II? What is the difference between Class II Type A2 and Type B2 BSCs? Is a canopy needed on this Type A2 cabinet? Are the chemicals I am using hazardous enough to warrant a Type B2? Can I convert my A2 to a B2 (or vice versa)? The questions go on and on.

Nothing before has answered so many questions, addressed so many shortcomings or simplified Class II BSCs before like the Purifier® Axiom™ by Labconco. Through innovative airflow channeling, intelligent programming and safety driven safety design, this revolutionary Class II cabinet boasts the cumulative safety of a Type B BSC while utilizing the flexibility of a Type A BSC. Furthermore, it can alternate between Type B and Type A mode in three simple steps.

SAFETY OF A TYPE B:

All Class II BSCs provide the same level of protection from hazardous aerosols, droplets or particles. Type B BSCs surpass the safety of Type A cabinets when it comes to handling chemical vapors due to their single pass airflow design. They are also recommended over Type A cabinets when handling hazardous powders or radionuclides because they can be fitted with Bag In/Bag Out HEPA filters. The Axiom also utilizes a single pass airflow design in an area of the cabinet called the Chem-Zone™, where active work is to be performed.

SAFER THAN A B:

When operating connected to its remote exhaust system, the Axiom in Type B mode and a Type B cabinet have few differences, but there is one that is significant. When an exhaust system fails, a Type B must engage its interlock and shut the cabinet down – becoming a dead air enclosure. The Axiom uses intelligent programming and sensor technology to recognize the same exhaust system failure, and utilizing its internal exhaust blower, maintains safe airflow through the cabinet for up to five (5) minutes. This programmable Active Protection Protocol™ alerts BSC operators to an exhaust failure and provides a countdown timer for BSC shut down – all the while keeping them safe. This allows the operator time to safely and controllably secure assets, and ready themselves to leave the cabinet safely.

FLEXIBILITY OF A TYPE A:

Though incapable of handling the hazardous chemical applications reserved for Type B BSCs, Type A cabinets are much more laboratory friendly. In a recirculating mode, they can placed on mobile stands allowing for movement required by today's modular lab designs. When ducted through a thimble or canopy connection, a Type A cabinet has much lower exhaust requirements and can often be installed into existing laboratory exhaust networks. Type B BSCs, however, require their own dedicated exhaust system per cabinet; once installed a Type B BSC is a slave to its mechanical system. The Omni-Flex™ design of the Axiom allows it to easily alternate between Type A and Type B modes as the laboratory needs change.

SAVINGS OF A TYPE A:

Along with the Type B BSC's dedicated exhaust system requirement, they also have high vacuum and volumetric air rate requirements. This makes them expensive to own and operate. In fact, a Type B2 BSC costs twice that of a Type A2, a Type B1 or the Axiom to own and operate due to its high airflow demands. A Class II Type B1 and the Axiom will require comparable airflow requirements, yet the Axiom can be disconnected from its ductwork and save the lab the precious air and energy it takes to temper that air that a B1 will always require.

BRIDGING THE GAPS:

The Axiom provides enhanced safety over all modern and current Class II BSC Types, while exhibiting unmatched flexibility. When combined, these advantages offer greater energy and budgetary savings over the life of the cabinet. Since this one BSC, the Purifier Axiom, can do everything a Type A or a Type B is capable of, saves money, is safer, is greener, is more flexible… the choice of which Class II Cabinet that is right for you is a no-brainer.

Protecting your laboratory environment
LABCONCO

Jenny Sprung, *Product Manager*, Labconco Corporation
816-822-37236
88114 Prospect Avenue, Kansas City, MO 64132
Toll free: 800-732-0031, www.labconco.com

Only Labconco serves up the best of both worlds.

Axiom™ ...it's a no-brainer.

Introducing the World's First Type C1* Biosafety Cabinet

Confused about what type of BSC you need? Should it be ducted or can it recirculate? What if your needs change later? Stop worrying about making the wrong BSC choice. With Axiom, you CAN have it all.

- **Flexible Exhaust** – re-circulates back into the room or vents outside
- **Convertible Sash** - programmable for 8 or 10" sash opening
- **Total Safety** - protects you, your samples and the lab

Find out more. Visit **www.BSCno-brainer.com.**

*Pending

Protecting your laboratory environment

LABCONCO®

Kansas City, MO | 800.821.5525
www.labconco.com

Made in the USA

ARE YOU IN THE MARKET FOR A...

CENTRIFUGE?

When it comes to common technology in a laboratory, centrifuges rise toward the top of the list. Centrifuges separate particles and structures suspended in liquid by applying thousands of gravitational force equivalents to the sample through spinning and play a role in a wide range of workflows and applications.

Types of centrifuge(s) used by survey respondents:

Environmental	22%
Benchtop Centrifuge	22%
Microcentrifuge	19%
Benchtop Refrigerated Centrifuge	19%
Floor Refrigerated Centrifuge	12%
Floor Ultracentrifuge	8%
Benchtop Clinical Centrifuge	8%
Benchtop Ultracentrifuge	7%
Floor Centrifuge	6%

Centrifuge speed range(s) used by survey respondents:

0 - 7,500 RPM	32%
7,500 - 10,000 RPM	18%
10,000 - 15,000 RPM	25%
15,000 - 20,000 RPM	13%
20,000+ RPM	12%

Nearly 20% of respondents plan on purchasing a centrifuge in the next year. The reasons for these purchases are as follows:

Replacement of aging centrifuge	52%
Addition to existing systems, increase capacity	23%
Setting up a new lab / developing a brand new method	21%
Require more speed (g-forces) and capacity	4%

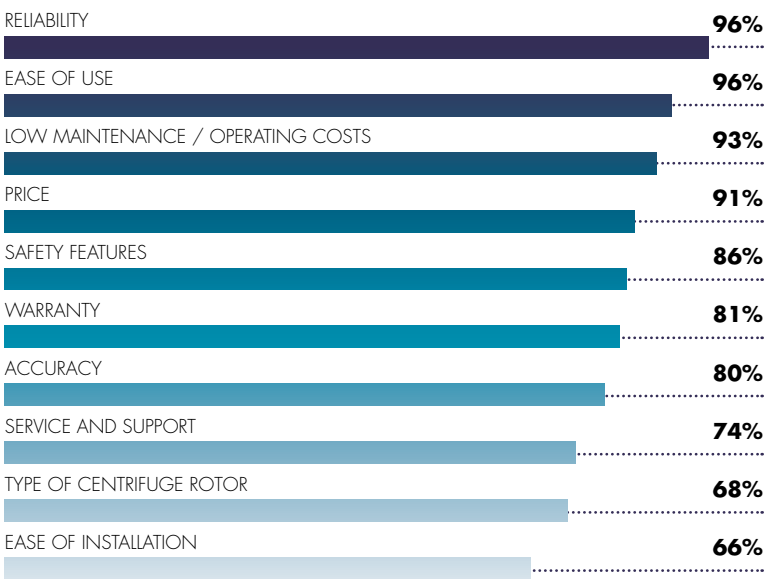
TOP 5 QUESTIONS

You Should Ask When Buying a Centrifuge

1. What is the maximum g-force the centrifuge can generate?
2. How does the company's centrifuge differ from other ones that can achieve the same speed and capacity?
3. What kind of warranty comes with the centrifuge and what does it cover?
4. If the company discontinues the product, for how many years do they provide accessories and parts for the centrifuge?
5. Ask about cost of the purchase— not just the price of the product being installed but the total cost of ownership including price, service expectations, warranty, etc.

TOP 10 FEATURES/FACTORS

respondents look for when purchasing a centrifuge



For more information on centrifuges, including useful articles and a list of manufacturers, visit www.labmanager.com/centrifuges

NEW!

Thermo SCIENTIFIC

performance simplified

Multiple users. A variety of processing requirements. A range of user experience. To overcome these everyday challenges of a shared laboratory setting choose the **NEW! Thermo Scientific Sorvall LYNX superspeed centrifuge**. With 100,000 x g performance and maximized capacity up to 6 liters. Plus breakthrough rotor innovations including Auto-Lock rotor exchange, Auto-ID instant rotor identification and lightweight and durable Fiberlite rotors that shorten run set-up time and increase rotor security. The result? Productivity, safety and reliability simplified.

at every turn

• thermoscientific.com/simplifynow

Sorvall LYNX Superspeed Centrifuges
Powerful technologies with breakthrough simplicity

Auto-Lock® Rotor Exchange
Push-button security and application flexibility

Auto-ID Instant Rotor Identification
Immediate rotor detection and programming

Fiberlite® Carbon Fiber Rotors
Improved ergonomics and performance

© 2012 Thermo Fisher Scientific Inc. All rights reserved.

INSIGHTS ON CO_2 INCUBATORS

MAINSTAY CELL CULTURE CHAMBERS

by Angelo DePalma, PhD

The relationship between form and function in carbon dioxide incubators has led to evolutionary changes in incubator design. In addition to tried-and-true water-jacketed CO_2 incubators, most vendors now offer incubators that employ direct heating. Lab managers specify these designs according to experience and personal taste. Processes that have worked well in water-jacketed incubators are likely to remain in this type of equipment.

Water-jacketed incubators are renowned for temperature stability, but return to temperature set point more slowly, say after opening the door, than direct-heated units. In the event of a power failure water-jacketed incubators remain warm longer, but take longer to return to set point when the power comes back on. They are also larger and heavier for a given work volume due to the water jacket.

▲ *CO_2 Incubator Shaker/ New Brunswick S41i / Eppendorf eppendorfna.com*

▲ *CO2 Incubators / CO2CELL BMT USA / www.bmtus.com*

Maintenance of water-jacketed units is also somewhat more complex. Users must add algaecide to the jacketed water, and these incubators cannot employ high-heat disinfection. Regardless, labs tend to stick with what has worked in the past, which guarantees that despite losing some market share to direct-heated incubators, demand for water-jacketed units will not disappear any time soon.

Many direct-heated incubators now are fanless, which imparts several benefits. "Moving air through natural convection rather than forcing air movement with a fan reduces both condensation and cross-contamination," explains Rick Ellison, business development manager, scientific division at BMT USA (Monroe, WA). Fanless designs also reduce maintenance by eliminating replacement of HEPA filters that cleanse incoming air and thus eliminating any cleaning or contamination issues arising from the fans themselves.

> "With incubators, the less mechanically complex, the better."

With incubators, the less mechanically complex, the better. "Other designs may be just as effective, but they introduce more variables," Ellison says. "The fewer variables, the lower the likelihood of something going wrong."

Setup, care, use

Physical location is key to ensuring high performance in CO_2 incubators. Lynn Philip, product manager at Eppendorf (Enfield, CT) suggests keeping the incubator away from ventilation ports and direct sunlight, both of which create atmospheric variability that stresses incubators and diminishes their lifetime. "Ventilation drafts also carry bacterial and fungal contaminants," Philip warns.

Whether using a central gas system or individual gas tanks, users should install an in-line pressure regulator at the CO_2 inlet to ensure that gas is supplied at recommended minimum pressure. Suboptimal pressure could lead to reduced performance and slow recovery, while

▲ *CO_2 Incubator* / Cell*IQ*™ *Panasonic Healthcare us.panasonic-healthcare.com*

Thermo SCIENTIFIC

A Thermo Fisher Scientific Brand

Designed to achieve

The new Thermo Scientific Heracell VIOS CO_2 incubator series represents a new era in incubator design delivering performance, ease-of-operation, and value required to support a range of culturing needs from basic research to demanding, leading-edge applications. By combining our latest technology advancements in contamination control and uniform growth conditions with existing proven and reliable features, you are now able to achieve your goals faster, more reliably, and with less effort.

your next breakthrough

- Learn more at **thermoscientific.com/heracellvios**

© 2014 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.

too-high pressure may damage the gas system, according to Philip. "Also, try to minimize the frequency and length of door openings to conserve optimal cell culture atmosphere," she says. "Split inner doors can reduce the loss of culture atmosphere during door openings."

Almost all incubators available today are equipped with self-cleaning technology. The most common uses high-heat disinfection, which is labor-free. For routine upkeep, Philips advises cleaning with 70 percent isopropanol or a manufacturer-recommended disinfectant.

Keep it clean

To say that contamination and/or cross-contamination are issues of *when,* not *if,* has become cliché. All the more reason for labs to prepare for that eventuality.

Ellison recommends systems that feature "strong sterilization, not just decontamination." BMT's sterilization technique of choice is the application of dry high heat, but other methods may be as effective. Whatever method is chosen, it should be as automated (and therefore error-proof) as possible. High heat takes longer than lower-temperature chemical or hydrogen peroxide sterilization but requires practically no user intervention.

▲ *CO_2 Incubators / C and CB Series BINDER / www.binder-world.com*

▲ *Borosilicate Glass Culture Tubes Denville Scientific www.denvillescientific.com*

Hydrogen peroxide sterilization may be justified on the basis of reduced downtime. The technique involves introducing peroxide gas into the chamber and then circulating it through an internal blower. A drawback of this technique compared with heat is that surfaces and internals must come into contact with the gas. The final operation involves activation with narrow-bandwidth ultraviolet light. Manufacturers claim that autoclaving is not required because all components remain within the enclosure throughout the process. But as Ellison notes, peroxide sterilization leaves behind some residual sterilized water that does not remain pristine for long and requires manual removal. Still, manufacturers claim downtime of about two hours for hydrogen peroxide sterilization, versus 14 hours for high heat.

> "Physical location is key to ensuring high performance in CO_2 incubators."

Uwe Ross, president of Binder, Inc. (Bohemia, NY), likens ongoing discussion of contamination to "beating a dead horse." But the proliferation of decontamination methods suggests that the problem remains unsolved. "Personally, I believe that hot-air sterilization at 180°C is the only method that really works, but even that technique cannot address what goes on during use, after sterilization."

Contamination arises from organisms settling on surfaces and growing with the assistance of condensation. This leads to a design approach that reduces working surface areas to an absolute minimum; less surface equals less room for microorganisms to grow.

A CO_2 incubator will do its job to protect an experiment or process, but only if operators follow best practices. In its excellent primer on cell culture, Invitrogen suggests the following contamination preventives:

- Wipe hands, work areas, and anything that enters the work area with 70 percent ethanol.
- Avoid pouring media and reagents directly from their factory containers, and reseal bottles immediately after use.
- Follow good pipetting practices: When in doubt, throw it away.
- Keep flasks, bottles, and dishes covered until use; rest caps with their tops down.
- Use only sterile glassware and equipment.
- Eliminate gratuitous exhalation (singing, whistling) while working, and perform experiments as rapidly as possible.

Factors to consider when purchasing

"Review short- and long-term laboratory and cell culture needs [in order] to identify factors critical to the purchase," says Philip. All incubators capably control temperature, CO_2, and possibly O_2, but units may differ significantly in

▲ *CO_2 Incubator / Heracell™ 240i / Thermo Fisher Scientific www.thermoscientific.com*

design and performance. If contamination is a concern, lab managers should pay special attention to incubator design and time to disassemble, clean, reassemble, and disinfect. "Be aware of future requirements, as CO_2 incubators are a long-term investment," Philip continues. "Total cost of ownership over the first five years—including initial price, installation, gas usage, time and labor for cleaning, routine spares, etc.—must be evaluated to identify the best value for your money."

Manufacturers and end users emphasize temperature uniformity and recovery to set conditions. Mary Kay Bates, global cell culture specialist at Thermo Fisher Scientific (Asheville, NC), encourages buyers to investigate these performance factors. "Ask to see temperature mapping and recovery data."

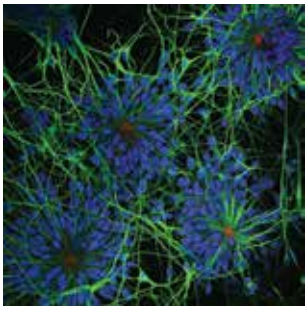
In considering recovery, the telling parameters are temperature, atmosphere composition, and humidity. "Humidity is the performance lynchpin, and not everyone appreciates that," Bates adds.

Humidity prevents water evaporation from culture media, which causes nutrients, minerals, and other media components to become more concentrated. "This may result in poor performance or even cell death," Bates notes.

Evaporation is four times higher at 80 percent humidity than at 95 percent humidity, which illustrates why humidity is king. The low-humidity, air-conditioned ambient air found in most labs exacerbates this effect.

Precise oxygen control has become another must-have for modern incubator work, particularly with hypoxic (low-oxygen) cultures. Oxygen levels inside organisms are much lower than the 21 percent level in the atmosphere. Moreover, all cells have unique oxygen requirements. Liver, kidney, and cardiac cells function optimally within organisms at unique oxygen levels, which may change even within organs. For example, liver cells require between four percent and 12 percent, depending on their proximity to oxygen-containing capillaries. Nerve, breast cancer, and immune cells will migrate away from an oxygen gradient, but Chinese hamster ovary cells used in biomanufacturing won't. As researchers increasingly work with cells that require almost no oxygen to survive, the need for fine-tuning oxygen levels has never been greater.

"Hypoxic cultures require oxygen uniformity throughout to ensure that cells on the bottom shelf receive the same concentration as cells on middle or top shelves," Bates says. "You want to duplicate physiologic conditions as closely as possible."



▲ *iPSC Derived Neural Cells / AMSBIO / www.amsbio.com*

"A CO_2 incubator will do its job to protect an experiment or process, but only if operators follow best practices."

In addition to temperature uniformity and recovery of critical culture conditions, Bates advises purchasers to consider automated disinfection to save time and costs related to manual cleaning and autoclaving. Large cell culture reactors, for example, use automated clean-in-place or steam-in-place techniques; incubators employ chemicals and/or heat. Some designs require users to remove internal components and clean or autoclave them separately, while in others components are sterilized in place. Regardless of the disinfection protocol, it should not in itself introduce risk of contamination or harm to cells.

Angelo DePalma *is a freelance writer living in Newton, NJ. You can reach him at angelo@adepalma.com.*

TECHNOLOGYNEWS

Our two highlighted tradeshows this month include the **Materials Research Society Fall Meeting and Exhibit (MRS)** and the **American Society for Cell Biology's annual meeting (2014 ASCB/IFCB)**. The 2014 MRS Fall Meeting takes place November 30-December 5, 2014 in Boston, Massachusetts, featuring over 6,000 presentations. Not long after, the 2014 ASCB/IFCB Meeting–a premier biomedical research conference–runs December 6-10 in Philadelphia, Pennsylvania. Its Keynote Talks will span the origin of life to the cosmos. Remember that the companies highlighted here in Tech News will be exhibiting, but these specific products may not be at the shows.

ANALYTICAL

Q-TOF GC/MS System

7200B

- Replaces the 7200A, with new capabilities that will significantly boost laboratory performance
- Features improved hardware performance, newly upgraded software features, and exact mass databases
- Provides improved mass accuracy specification of less than 3 ppm and an extended mass range, optimizing its capabilities for the most challenging problems
- Includes chemical ionization source and backflush capabilities as standard

Agilent www.agilent.com

Particle Size & Zeta Potential Analyzers

Nicomp N3000

BOOTH 710

- Measure particle size from 0.3 nm – 10 μm and zeta potential in aqueous and organic solvents
- New capabilities include expanded size and concentration dynamic ranges
- Touch panel display allows for easy viewing of count rate
- Zeta potential is now measured using a proprietary DSP-based phase analysis light scattering module which is more sensitive, stable, and works at higher concentrations

Particle Sizing Systems www.pssnicomp.com

Benchtop Spectrofluorometer

FluoroMax Plus

BOOTH 917

- Expands on the capabilities of the FluoroMax series with the option of a second detector and two position grating turret, providing an extended range out to 1650 nm, and TCSPC performance down to 25 ps
- Enables faster measurement of weaker and smaller samples
- Convenient and easy to use

HORIBA www.horiba.com/scientific

Two-Dimensional Liquid Chromatograph

Nexera-e Comprehensive

- Offers a powerful separation method for the most complex sample matrices
- Combines two independent separation modes orthogonally in combination with a dual-loop/dual-valve alternate switching system to increase separation efficiency
- Enables the separation of peaks that are difficult to separate using conventional LC
- Achieves the highest possible theoretical plates for LC separation

Shimadzu www.ssi.shimadzu.com

Core-Shell Column Line

Aeris® PEPTIDE

- Now includes a 5 μm particle size for small-scale purifications
- Enables higher efficiencies and higher loading capability for small-scale peptide purification in 10 mm ID semi-prep columns and 21.2 mm ID Axia™ -packed prep columns
- Fully scalable over four particle sizes–1.7 μm, 2.6 μm, 3.6 μm, and 5 μm–enabling easy method transfer

Phenomenex www.phenomenex.com

Triple Quadrupole GC-MS/MS

TSQ Duo

BOOTH 422

- Designed specifically for labs needing to maintain their current GC or single quadrupole GC-MS workflows while adding triple quadrupole capabilities with minimal disruption
- Allows users to run their current methods and then easily move over to MS/MS analysis when the time is right for them, on a familiar system using the Chromeleon chromatography data system

Thermo Fisher Scientific www.thermoscientific.com

BASIC LAB

Mini-Peristaltic Pump

Improved Model TPT

- Provides low cost, reliable service
- Flow rates are user-selectable from 7 mL/min to 28 mL/min by selecting from a choice of four different RPM drives (8, 12, 17, or 25) and tubing sizes
- Simple to load and operate
- Two plastic slide on/off plastic tubing holders accommodate easy tubing replacements or tubing size changes

Aalborg Instruments www.aalborg.com

Thermoelectric Sample Conditioner

TESC System

- Incorporates a Brookfield® DV2T digital viscometer and thermoelectrically controlled sample chamber
- Automates the entire conditioning and testing process, including preheating, room temperature stabilization, cooling of the sample to test temperature, and testing the final viscosity of the conditioned sample
- Lessens the hands-on time needed to prepare and run a D2983 viscosity test and improves test precision

CANNON Instrument Company www.cannoninstrument.com

Integrated Vacuum Controller

CVC3000 detect

- Combines the CVC3000 vacuum controller and a solenoid valve, to provide advanced two-point control for any stand-alone diaphragm vacuum pump from VACUUBRAND® or competitive units
- New "detect" feature allows the CVC3000 to automatically find the first boiling point with a rotary evaporator
- Allows the preprogramming of up to ten multi-step programs, bi-directional communication via RS232 serial port, and more

BrandTech Scientific www.brandtech.com

Rheometer Application Packages

HAAKE™ Viscotester™ iQ

BOOTH 422

- Include a DIN package for liquids with medium viscosities; a yield point determination package for difficult to measure samples, and an educational package for beginners
- DIN package features a liquid temperature control module and coaxial cylinder geometry accessory
- Yield point determination package includes a universal container holder and vane rotor
- Educational package includes a Peltier temperature control module, coaxial cylinders and parallel plates geometry accessories, and RheoWin™ software

Thermo Fisher Scientific www.thermoscientific.com

Temperature Controller

Meros TCU-100

- Offers advanced temperature control from 1 to 100°C for microfluidic chips, microscope slides and other third party devices
- Chemically resistant, robust, reliable, and only 11cm (4 ¼ inches) wide
- Enables cooling, heating and thermocycling with an accuracy of 0.5°C, stability and target temperature resolution of 0.1°C, and rapid ramp rates up to 1°C/s

Dolomite www.dolomite-microfluidics.com

Industrial Variable Speed Metering Pump

IVSP

- Suited for viscous fluids
- Features a rugged 1/4 HP variable speed drive motor and available with sanitary quick-disconnect fittings
- Speed is controlled via a DIN mountable controller for both manual and electronic speed control
- Valveless function is accomplished by the synchronous rotation and reciprocation of the ceramic piston within a precisely mated ceramic liner

Fluid Metering www.fmipump.com

Movable MS Bench

- Features solidly-built lockable casters
- Provides noise reduction performance of - 15 db(A) (75% reduction in noise perception)
- Can house either one or two vacuum pumps
- Allows easy access to the rear of the instruments
- Noise reduction cabinet integrates an audible & visual (red LED) overheating temperature alarm (on battery backup) for an increased vacuum pump lifetime

IONBENCH www.ionbench.com

Analog Hotplate Stirrer

AccuPlate

- Full range of products offers heat, stir, and a heat/stir combination model, making them suited for the science and education or research markets
- The 7"x7" ceramic coated hot plate has a maximum temperature surface rating of 380°C, with stirring speeds that can be precisely controlled between 100-1500rpm with a maximum capacity of 5 liters
- Features a large control panel

Labnet International www.labnetinternational.com

Gas Sorption Analyzers

Autosorb iQ3

- Gives users the choice to use up to 3 physisorption analysis stations
- Provides up to 200% higher capacity and throughput for larger, busy material characterization labs
- Features up to four on-board degassing ports providing cold-trap, PC-controlled ramp, hold and test protocols
- Three samples can be analyzed simultaneously while the degas ports are used for sample preparation

Quantachrome www.quantachrome.com

N2 Gas Bubblers

- Enable chemists to visibly confirm that their reaction system is being flushed with an inert gas such as nitrogen
- Provide a one-way valve through which nitrogen, evolved gases or solvent vapors from the inlet will bubble through the fluid before being vented to the atmosphere
- Affordably priced

Asynt www.asynt.com

Laboratory Gas Burners

Fuego SCS Series

- Offers more convenience through the new graphic display and comfort functions
- The animated, self-explanatory and wordless symbol display facilitates a rapid and easy selection of all functions
- Streamlined design reduces air flow disturbances in laminar flow hoods
- Safety Control System SCS demonstrates state-of-the-art safety technology which constantly analyzes potential hazards and, if necessary, initiates safety measures

WLD-TEC www.wld-tec.com

CELL CULTURE

Aspiration Controller for Cell Culture

VACUUBRAND® VHC PRO

- Ergonomic design accommodates several different hand positions for comfortable fluid aspiration using Pasteur pipettes or pipette tips
- All aspirated liquid is contained in the tubing for easy decontamination and minimizing air leakage
- Optional 8-channel manifold with tip ejector is available
- Supplied with the VACUUBRAND® BVC line of fluid aspiration systems and can easily be fitted to aspiration systems from major manufacturers

BrandTech www.brandtech.com

Automated Cell Culture System

CompacT SelecT

- Allows researchers to set up their cell culture seeding, feeding, expansion, plating and maintenance protocols to automatically produce consistent quality cells for extended periods of time
- Includes a unique SelFeeder liquid handling unit that allows scheduled feeds and media changes and also has a gentle liquid addition and removal action
- Helps reduce damage to cell layers

TAP Biosystems www.tapbiosystems.com

CHEMICALS, KITS & REAGENTS

Dicer siRNA Generation Kit

- Mimics the natural RNA interference process by using recombinant human dicer enzyme, a double-stranded RNA-specific endonuclease, to cleave in vitro transcribed dsRNA templates into a pool of 22 bp siRNAs
- Allows easy and cost-effective generation of a large number of small interfering RNAs (siRNAs) from full-length target genes
- Contains everything required for preparing double stranded RNA, RNA cleavage, siRNA cleanup and transfection

AMSBIO www.amsbio.com

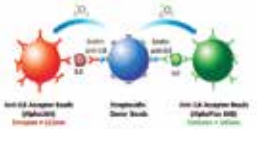
Gamma H2AX Pharmacodynamic Assay Kit

- Designed for the study of double strand DNA breaks through the detection of gamma H2AX
- Developed for anti-cancer drug screening, basic research and upcoming clinical trials providing one of many needed tools to support hypothesis-driven drug design strategies
- Documents differences in gamma H2AX levels in peripheral blood mononuclear cells, cultured cells, and tissue biopsies

AMSBIO www.amsbio.com

Multiplexing Reagent System

AlphaPlex™



- Designed to extract more information from each assay by simultaneously quantifying multiple analytes in a single well
- Utilize PerkinElmer's AlphaLISA® technology to quantify multiple analytes in a single well
- Can reduce total assay time from one or two days to as little as two hours

PerkinElmer www.perkinelmer.com

INFORMATICS

Operating Software for HR-CS AAS Instruments

ASpect CS V 2.0

- Designed for the contra® series of instruments
- Main new features include simultaneous multi-element analysis of any number of analytical wavelengths within the spectrum window
- Integration ranges for each line can be selected freely, for increased sensitivity
- A new background correction method and an improved spectral correction of interferences allow simple and automatic correction of complex structured spectral background and overlapping matrix lines

Analytik Jena www.analytik-jena.com

Laboratory Information Management System

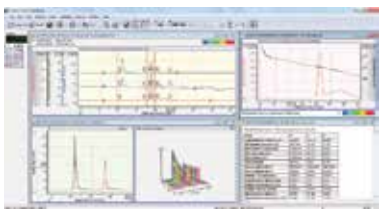
Matrix Gemini

- Supplied complete with three separate databases
- Since each database can have its own independent design, this arrangement means that widely varying requirements can be accommodated on the same system
- Matrix Gemini is an ODBC (Open Database Connectivity) compliant system which will operate with a number and mixture of commercial databases to suit either corporate standards or user preferences

Autoscribe www.autoscribeinformatics.com

Protein Analysis Software

OmniSEC 5.1



- Makes it easy to integrate any of the Viscotek SEC detectors with Waters Empower® -driven SEC systems, for powerful, efficient protein characterization
- Features the ability to directly interrogate analytical sequences within the Waters Empower® software
- Eliminates the need to input sequences in duplicate, making an integrated system easier to use, quicker to set-up and less prone to errors

Malvern www.malvern.com

LAB AUTOMATION

NGS Workstation

Freedom EVO®

- Simplifies next-generation sequencing (NGS) sample preparation and PCR set-up
- Offering user-friendly, walkaway automation of library preparation at the touch of a button, it eliminates the need for extensive manual processing
- Designed to offer robust and reliable automation—including library preparation, quantification, qPCR set-up, normalization, pooling and capture—even for inexperienced users

Tecan www.tecan.com

LIFE SCIENCE

Cardio System

xCELLigence RTCA CardioECR

BOOTH 409

- Combines impedance and multi electrode array (MEA) technology with a pacing function
- The first platform to allow simultaneous cardiomyocyte contractility and field potential measurement
- Designed to be placed in a standard tissue culture incubator with physiological temperature, CO2 level and humidity, allowing better controlled assays with both short-term and long-term measurements in real-time

ACEA Biosciences www.aceabio.com

Modular Real-Time PCR System

AriaMx

- Can multiplex up to six channels and deliver higher optical resolution for crisp and clear data capture in each channel
- Features rapid cycle time and ultra-fast brilliant qPCR reagents that enable rapid, comprehensive workflow
- An onboard diagnostic system provides two modes: a quick pre-test, which covers over 60 performance attributes, and a comprehensive 30-minute test, which covers more than 120 attributes

Agilent www.agilent.com

Solution for In-Vitro CRISPR/Cas9 Research

SureGuide

- Complete workflow includes a SureGuide Cas9 nuclease kit, SureGuide gRNA synthesis kit and SureGuide gRNA control kit, all designed to work together for any lab interested in quickly enabling next-generation genome engineering
- Series of tools will enable in-vitro cloning of large genes or complex DNA mixtures without the limitations imposed by common restriction enzymes or PCR fidelity

Agilent www.agilent.com

Chemiluminescent Imaging System

ChemiDoc Touch
BOOTH 224

- Surpasses the performance of film in terms of quantitation and sensitivity
- Improves the user performance of other digital imagers with more intuitive and efficient image capture, review and export
- Allows detection of faint bands missed by film and produces publication-quality images
- Wide dynamic range permits easy and reliable quantification even of highly abundant proteins

Bio-Rad www.bio-rad.com

Atmospheric Control Unit

- Designed for the CLARIOstar® microplate reader
- Fully regulates and independently controls both O_2 and CO_2 within the microplate reader chamber
- Provides the optimal environment for any live cell assay
- Makes it unnecessary to change gas cylinders or piped gas supplies to reproduce the specific physiological conditions needed for cell-based assays

BMG LABTECH www.bmglabtech.com

PRODUCT SPOTLIGHT

VANQUISHING VARIABILITY

NEW SYSTEM STANDARDIZES WESTERN BLOTTING FOR MORE CONSISTENT ANALYSIS

BOOTH 525

Last month, GE Healthcare Life Sciences launched its new Amersham WB system, a fully integrated system for quantitative SDS-PAGE and Western blotting of proteins using fluorescence detection. The system aims to reduce the variability seen with conventional Western blotting by standardizing and monitoring each stage of the Western blotting process, including electrophoresis, transfer, probing, and scanning. That means more consistent, quantitative protein analysis.

"The value of the insights provided by Western blotting has kept it relevant for more than 30 years, but its shortcomings are well-recognized," said Eric Roman, general manager of research and applied markets at GE Healthcare Life Sciences. "Building on GE's heritage and expertise in protein analysis, what we have developed is a system that is set to shift how scientists see and use Western blotting from now on, with a clear focus on reliability and quantification of results, regardless of user."

Western blotting requires a complex combination of analytical knowledge, extensive manual handling, dexterity and strict adherence to protocols in order to achieve reliable results. According to GE, failure rates, however, can be as high as 25 percent and data variations between different users can be as high as 35-40 percent. The Amersham WB's standardized Western blotting workflow typically achieves a variability of less than 10 percent between users.

"The publication landscape has changed dramatically over the past year, and the need for quantified blots and data is of significant importance for peer-reviewed journals," said Martin Teichert, a research scientist at DKFZ (German Cancer Research Center) in Heidelberg, Germany. "I think that the Amersham WB system fits perfectly into this niche, and solves this problem of having quantifiable data that can be relied upon. It has arrived at just the right time."

For more information, visit https://promo.gelifesciences.com/gl/artofwesternblotting/

Centrifugal Vacuum Concentrator

miVac Quattro

- Rapidly removes a wide range of solvents, from volatile organic solvents through to DMF, including water
- Especially suited for concentrating precious samples in applications including oligonucleotide synthesis, RNA/DNA preparation, peptide preparation, sequencing, molecular biology and ADME / toxicology research
- Capable of removing water and organic solvents from biological samples in a range of formats including tubes, microplates, and vials

Genevac www.genevac.com

Transcriptome Solution

Ion AmpliSeq
BOOTH 201 AND 219

- Provides access to a wealth of valuable RNA data
- Draws gene expression profiles from just 10ng of RNA sets
- Compatible with formalin-fixed, paraffin-embedded (FFPE) samples
- Provides a faster and more cost-effective workflow without the sample manipulation required for microarrays or analytical complexity normally associated with whole transcriptome RNA-sequencing

Life Technologies www.lifetechnologies.com

Collagenase/Neutral Protease Blends

STEMxyme®
BOOTH 800

- Available for primary and stem cell isolation, regenerative medicine, biopharmaceutical and cell bioprocessing applications
- Animal origin free (AOF)
- New, specialized combinations of AOF *Clostridium histolyticum* collagenase and AOF *Bacillus polymyxa* neutral protease (Dispase®) offer a minimum of 250 CLS units and 1,000 or 2,000 caseinase units per mg dry weight, respectively

Worthington Biochemical www.worthington-biochem.com

Scanning Electron Microscope

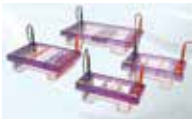
Teneo VS™
BOOTH 323

- Integrates FEI's latest-generation SEM with VolumeScope, an in-chamber microtome and proprietary analytical software to provide fully-automated, large-volume reconstructions with dramatically improved z-axis resolution
- Ensures fast, easy analysis, while the combination of ThruSight™ and MAPS™ software delivers unprecedented resolution over large sample volumes
- Switching between volume imaging and normal SEM operation is fast and easy

FEI www.fei.com

Horizontal Gel Electrophoresis Units

MultiSUB™



- Each unit provides an easy to use, versatile and flexible system that can evolve and adapt with the changing needs of today's laboratory researcher
- All five units in the MultiSUB range deliver a combination of economy of gel and buffer volume, with gel size and sample number versatility
- Gel size and sample number requirements can be exactly matched in each unit, with the option of additional gel tray sizes

Cleaver Scientific www.cleaverscientific.com

SUPPLIES & CONSUMABLES

Custom Specified Laboratory Apparatus

- Exactly meet the demands of the user's application or project
- Company also offers a totally bespoke solution for pressure reactors ranging from just a few millilitres to 50 litres capacity and different construction materials for corrosive and caustic materials
- Custom versions of DrySyn range of heating and cooling blocks, glassware, and PTFE components and apparatus also available

Asynt www.asynt.com

Pipette Tips

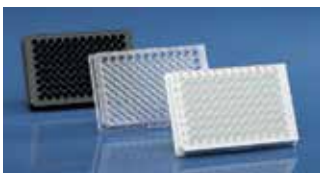
BRAND

- Include sterile, non-sterile, filtered and ultra-low retention tips
- Feature a new, environmentally-friendly box and insert system with lids that can hinge or lift off
- Manufactured in BRAND's new state-of-the art clean room and packaged DNA-, RNase-, ATP- and endotoxin-free
- Fit pipettes from all major manufacturers

BrandTech www.brandtech.com

Microplates

inertGrade™



- For the cultivation of non-adherent cell lines, spheroids, and stem cells in a 96-well plate format
- Treated with a proprietary hydrogel that creates a hydrophobic interface between the surface of the plastic and cellular material to inhibit cell and protein attachment
- Microplate surface successfully suppresses the adhesion of a wide variety of adherent cell lines, and more

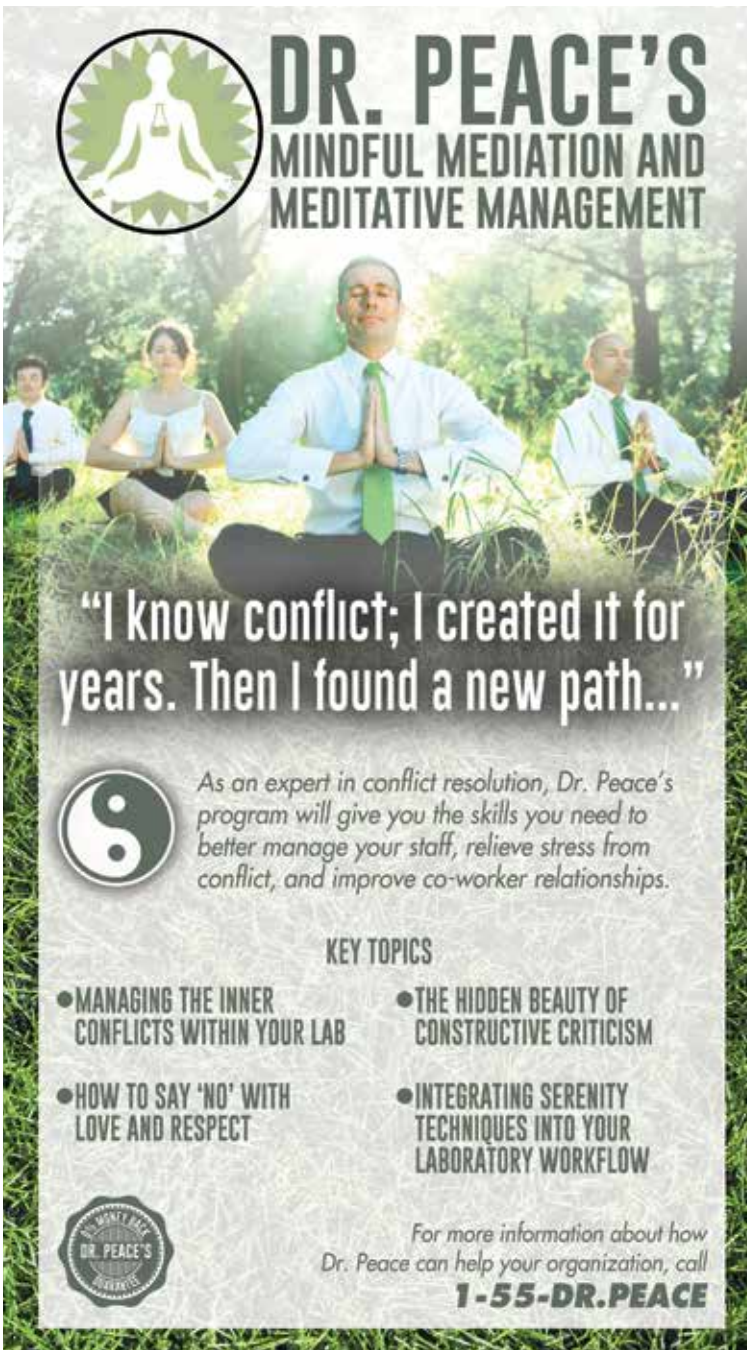
BrandTech Scientific www.brandtech.com

Solid Phase Extraction Microplate

Development Microlute™

- Offers scientists a choice of up to 12 different phases and sorbent loadings (10 -100mg) in a standard format 96-well plate
- Allows users to simply and rapidly screen for the optimal retention and selectivity required to achieve their sample preparation objectives
- Delivers considerable savings in valuable laboratory time
- Constructed from a single piece of molded high quality polypropylene

Porvair Sciences www.porvair-sciences.com


DR. PEACE'S
MINDFUL MEDIATION AND
MEDITATIVE MANAGEMENT
"I know conflict; I created it for years. Then I found a new path..."
As an expert in conflict resolution, Dr. Peace's program will give you the skills you need to better manage your staff, relieve stress from conflict, and improve co-worker relationships.
KEY TOPICS
MANAGING THE INNER CONFLICTS WITHIN YOUR LAB
THE HIDDEN BEAUTY OF CONSTRUCTIVE CRITICISM
HOW TO SAY 'NO' WITH LOVE AND RESPECT
INTEGRATING SERENITY TECHNIQUES INTO YOUR LABORATORY WORKFLOW
For more information about how Dr. Peace can help your organization, call
1-55-DR.PEACE

LABORATORY BALANCES

CALIBRATION AND CLEANING ARE ESSENTIAL

by Rachel Muenz

▲ Calibration is one of the most important parts of keeping your balance in top shape

Keeping your laboratory balances up to snuff is pretty simple, but there are a few things to remember to ensure the process goes smoothly.

"The most important thing to remember in lab balance maintenance is to keep the balance clean and calibrated," says Tom Storey, director of marketing at Adam Equipment. "You should follow any specific manufacturer's recommendations that come with the balance."

He adds that the user's manual is a great place to start when maintaining your balance as it outlines all of the proper maintenance tasks for that specific balance.

As for how frequent maintenance should be, Andrew Hurdle, laboratory market manager for OHAUS Corporation, recommends that, in general, most facilities should service and calibrate their balances on an annual basis.

"This is also dependent upon how often you use your balance, the working environment, and any other regulatory mandates for your industry," he says. "Some facilities may need to have routine calibration conducted more frequently, such as monthly or even daily."

Hurdle stresses that any time the balance is not performing as it did when the lab first began using it, users should contact their local service provider to have it checked out.

"Most manufacturers tell you to calibrate a brand-new balance before using it," as the simple process of shipping can affect the mechanics of the balance, Storey adds. "Frequent calibration ensures consistent results and maximizes precision in your measurements. If you notice your balance is delivering readings that are inconsistent or less repeatable, it's definitely time for calibration."

If a user's lab experiences frequent temperature or barometric changes, they will need to calibrate their balances more often as such fluctuations mean inaccurate results.

"Fluctuations in barometric pressure can wreak havoc with the results from a precision or analytical balance that hasn't been calibrated," Storey says. "And if the location in which you're working has a different gravitational force than that of the factory producing the balance, calibration is necessary for precise measurements."

As with other lab instruments, there are plenty of mistakes users make when looking after their balances. Hurdle notes that not using a certified technician to perform routine maintenance or not using certified weights to perform the calibration when doing it themselves are common errors he sees users make.

"Always be sure to use a company that has been properly trained to work on balances by the manufacturer of

your balance," he stresses, adding that, "It is also important to store calibration weights in the proper containers where they will remain free from dust or smudges and at the proper ambient temperatures. Calibration weights should also be handled with the proper gloves and forceps where applicable to prevent damage."

Storey says users need to be careful when cleaning, storing, and moving their balances, as applying more pressure or weight to the pan than it can handle can cause damage.

"It's best to remove the pan when cleaning or storing your balance," he says. "If you don't, you might accidentally set something on top of it, and then wonder why it's not working."

Simply forgetting to calibrate your balance is another mistake that can lead to large issues, but is easily solved by keeping a log to record maintenance tasks, Storey adds. A maintenance log is "very beneficial, especially if there are multiple users operating the balance," he says. "Also, if you need professional repairs done, it's helpful for the technicians to know exactly what you've done and when you did it."

Apart from the user's manual, calling the manufacturer for maintenance tips or to help solve any issues you have is a good resource in caring for your balance. Overall, just remembering to do maintenance and being gentle are the keys to a happy balance.

"Rough handling of a balance is one of the leading factors to a balance not performing at optimum levels," Hurdle says. "If possible, once your balance is initially set up, it should not be disturbed."

Check back with us next month as we share the essentials of maintaining laboratory cold storage equipment.

▲ Routine maintenance on your balance should always be done by a certified technician.

OTHER WAYS TO SAFEGUARD YOUR BALANCE:

- Using the balance in harsh environments (exposing to corrosive materials, temperature extremes, exposed to water or moisture, dirt/dust getting inside of product, etc.) can lead to balance damage and inaccuracy. Use the appropriate cleaning agents to routinely clean your balance. Some agents can significantly damage balance surfaces, so be sure to consult the balance's service manual before using a cleaning solvent on the balance.
- Plug your balance into a power surge protector.
- Allow the balance to warm up to room temperature levels before use.
- Do not leave items on the balance weighing pan for an extended amount of time.
- Most manufacturers' standard warranties cover the balance from manufacturer defects, but often repairs fall outside of that warranty. Whether or not you should purchase an extended warranty depends on the value of the balance, how you use it, the level of wear and tear on the instrument and risk of damage, and how critical the balance is to your daily operations

AN EASY-TO-USE CELL SORTER

Problem: Scientists must typically rely on high-end cell sorters in core facilities to run their samples. These cell sorters—equipped with five or more lasers and double digit detection channels—were originally utilized to answer pressing questions arising in the immunology field. However, they are overly complex for the new breed of user who sorts cells today: cell biologists and biochemists who employ fluorescent proteins and require at most four colors and one-to-two population sorting. The challenge is that as demand increases, the number of staff available to operate these complex instruments remains the same. As a result, wait times at core facilities have ballooned, literally putting research on hold until capacity is available. For the more than half of today's cell sorting users who require four colors or fewer sorts, the elaborate equipment is becoming a bottleneck.

Solution: Instead of waiting days or sometimes weeks to use a core facility, biologists who only need to perform basic sorts now have an alternative. A number of compact, affordable and easier-to-use cell sorters has recently entered the market. Flow core directors are also looking at these "personal sorters" to add capacity to their facilities, alleviate wait times, and free up their higher-end cell sorters for more complex sorts. One example is Ryan Duggan, technical director at the University of Chicago's flow cytometry core facility. Researchers were waiting up to 16 days to sort cells in his core lab. Becoming aware that personal sorters might be the solution to this bottleneck, he tested three of them side-by-side (see chart). He found that Bio-Rad's new S3 cell sorter was comparable to the others in terms of performance, but stood out for its ease-of-use.

The S3 system was designed so even novice users can quickly set it up. And calibration, typically an issue for high-end instruments, requires no user involvement. Just by clicking the power button, the system performs a hands-off startup sequence that automatically aligns the lasers, optimizes the droplet/side stream and turns the stream on. With one more click, the instrument completes a one-bead alignment QC and drop delay assessment. The researcher can then begin sorting.

This system also takes care of the little details that more complex cell sorters ignore. Instead of forcing someone to watch the collection tubes fill up, stop the sort, and insert a new empty tube, the S3 automatically knows when to move to the next empty tube. Also, the system can detect bubbles and clogs and stop the sorting process, thus preventing bad sorts.

The S3 is equipped with one to two lasers (488 nm and either 561 or 640 nm) and up to four fluorescent detectors. Such a system is ideal for high-speed enrichment of cell populations expressing fluorescent proteins, high-purity isolation of rare cells labeled with fluorescent markers, and the isolation of single cells for single-cell biology. The fluidics, pressure, and temperature controls are neatly stowed away inside the instrument, permitting a small footprint. All of these features come at cost that is a fraction of the traditional, more complex cell sorter, putting cell sorting within reach of every researcher, whether in their lab or at a core facility.

	Jazz	S3	Jr
Efficiency	+++	+++	++
Purity	++	++	++
Resolution	++	+++	+
Easy	+	+++	+

▲ *Table 1: Ryan Duggan's conclusions arrived after testing the BD FACSJazz, Bio-Rad's S3 cell sorter, and the JSAN Jr. Swift. The S3 stood out for its user-friendliness.*

For more information, please contact Bio-Rad at 510-741-4043 or Robert_Archer@bio-rad.com, or visit www.bio-rad.com/S3_lm

SAVINGS FROM ON-SITE GAS GENERATORS ARE LIMITLESS.

- ROI IN LESS THAN 1 YEAR
- FASTER ANALYSIS
- LOW MAINTENANCE COSTS

PROTON
THE LEADER IN ON SITE™ GAS GENERATION.

ProtonOnSite.com | 203.949.8697 | info@ProtonOnSite.com

A MINI PLATE SPINNER

Problem: Achieving successful PCR (polymerase chain reaction) results requires proper control of many factors and parameters. The yield—quantity and quality—of amplified DNA is often essential for downstream applications and ultimately successful completion of experimental research. PCR reagents, consumable sample vessels, and the thermal cycler instrument must all be properly chosen for the specific PCR application, and must also meet quality and performance requirements. In addition to these components that must work correctly in conjunction, sample preparation is typically done manually and must be done with care and accuracy.

One of the crucial, manual sample preparation steps in the PCR process is removing the final amplified product from the PCR plates following the thermal cycling procedure. If these liquid handling steps are not performed accurately, PCR yield will be significantly affected.

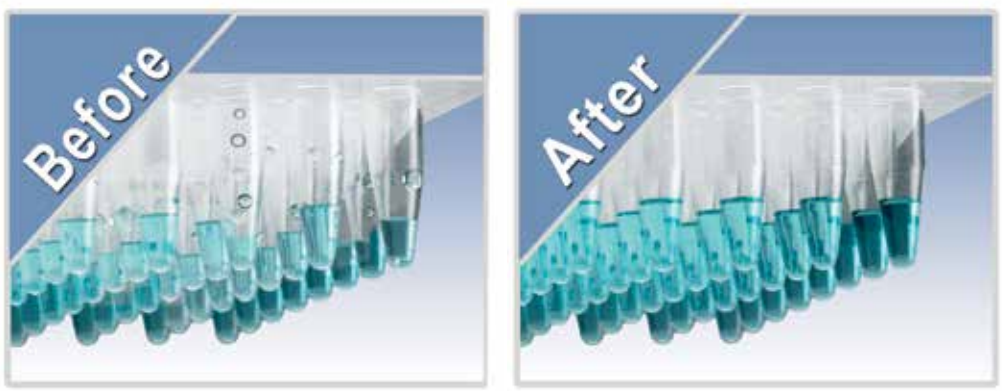
Solution: It is widely known that centrifugation of PCR plates before and after the thermal cycling process aids in positioning the liquid reagent samples at their proper locations in the bottom of the sample wells. Inconsistent or imprecise pipetting of the samples into the plates during PCR set up can lead to small droplets of solution on the side walls of the plate wells (see figure 1). Incomplete mixture of the reaction reagents and target DNA samples, in this case, can and will lead to poor amplification results. Another common problem when pipetting such small volumes of samples into the plate wells is the formation of bubbles in the samples. Bubble formation leads to non-uniform contact of the samples to the surface of the plastic wells, and this can cause poor or inconsistent heat transfer during the thermal cycling process. Centrifugation of the plate prior to thermal cycling brings the entire quantity of reagent mixture to the bottom tips of each of the conical wells, ensuring a well-mixed sample and concentration of all reagent components and removal of any bubbles.

There are many commercially available centrifuges for spinning 96-well microtiter plates, and PCR plates. These typically use a large, expensive swing out rotor, with plate holding trays. Most of these centrifuges are designed to accept a variety of different rotors, have sophisticated electronic control systems, and take up valuable lab bench space.

One alternative to such units is Labnet International's MPS-1000 Mini Plate Spinner centrifuge, which is designed specifically for quickly spinning down PCR plates before and after a PCR reaction. Unlike standard benchtop centrifuges with microplate rotors, this plate spinner is compact in design and simple to operate. Sealed PCR plates are inserted vertically into the instrument, and the surface tension of the small samples keeps them from moving within the sample wells. The spinner accommodates all standard plate sizes or ½ plates, strips, or tubes when using the optional adapter. The entire centrifuge process is quick, easy, cost effective, and results in a guaranteed homogeneous sample mixture.

For more information, please contact Labnet International, Inc. at: labnetinfo@corning.com, www.labnetinternational.com, or 732-417-0700

➤ *Labnet International's MPS-1000 Mini Plate Spinner centrifuge.*



➤ *Figure 1: Inconsistent or imprecise pipetting of the samples into the plates during PCR setup can lead to small droplets of solution on the side walls of the plate wells.*

A SINGLE-STEP SPILL AGENT

Problem: An emergency spill response plan is part of every laboratory safety protocol. However, despite all the best precautions, accidents can happen! Laboratories often house chemicals such as acids, bases, solvents and flammables—all of which can be toxic to human health and the environment if used incorrectly or spilled. Traditionally, spills have been addressed by the use of absorbents, or a variety of spill-specific neutralizers (that is, one agent specific for acids, one agent specific for bases, etc.). However, there are several issues with these types of individualized approaches:

- **Absorbents: Absorbents will do just that; absorb a spill. But that alone does not change the chemical properties of the spill. A toxic spill will potentially remain toxic after being absorbed only.**
- **Individualized neutralizers: In the case of emergency spill response, time is of the essence. The use of individualized neutralizers specific to certain spills necessitates that you know what your spill is (acid or base, for example) before employing treatment. This identification phase requires time, and the longer it takes to address the spill, the more dangerous the situation becomes.**

The faster the spill response, the safer the situation. Finding the quickest and most efficient way to deal with spills is essential for the safety of you and those around you.

Amphomag® universal spill sorbent with pH indicator.

Solution: A laboratory safety protocol involving the use of a single-step spill agent ensures that spills will be addressed as quickly as possible. Employing one, multi-function agent that not only absorbs a chemical spill, but also neutralizes and is safe to use on acids, bases, solvents and flammables, offers the most streamlined approach to dealing with an emergency.

The Amphomag® universal spill neutralizer, manufactured exclusively by Premier Magnesia, LLC, is a leading technology in emergency response. Amphomag® is a unique, rapid response chemistry that safely absorbs and treats all spills. This single product can be applied in any emergency situation to safely and easily control hazardous releases. It is used to: neutralize acids, neutralize bases, adsorb liquids, control odors and neutralize gases. This product also contains a multi-range pH indicator that further simplifies spill response. When applied to the spill, Amphomag®'s color turns to red for acids and blue for bases.

Advantages of a one-step spill solution:

- Quicker spill response—the spilled material doesn't require identification before agent is applied
- One solution for acids and bases, volatile organic compounds as well as inorganic chemicals like chlorine, ammonia, sulfur dioxide and hydrogen chloride
- Stable for long-term containment of highly hazardous materials because neutralized
- No misapplication or overdosing
- Safer and easier to use, requiring minimal special training and safety equipment
- Reduced heat and spattering seen with commodity neutralizers

The more efficiently and effectively you can address emergency scenarios in your environment, the better off you will be from a safety, cost and liability standpoint. It's important to continually re-evaluate your protocols to ensure that you have the best program and products available for your lab to deal with any unforeseen situations as quickly as possible. And at the end of the day, minimizing the steps to safety is the best road to safety.

For more information related to specific experience relevant to your application, please contact us at Amphomag@premiermagnesia.com, or visit www.amphomag.com.

slas 2015

4th annual CONFERENCE & EXHIBITION

february / **seven - eleven**

WASHINGTON, DC / **SLAS2015.ORG**

WALTER E. WASHINGTON CONVENTION CENTER

COME TRANSFORM RESEARCH AT SLAS2015

Join more than 5,000 of the brightest, most innovative minds vested in scientific automation at SLAS2015 as they come together to learn, share and explore how to transform scientific research using technology. Scientists, engineers, researchers, business leaders and technology providers from industry, academia and government backgrounds will benefit from 132 peer-selected podium presentations comprising 33 unique scientific sessions, hundreds of posters, plentiful networking opportunities and access to the latest technologies from 300+ exhibitors from around the world. Participating at SLAS2015 is an invaluable investment that pays significant dividends toward your personal and organizational goals, as well as your professional success.

REGISTER NOW AT SLAS2015.ORG

SLAS2015 Scientific Program Crosses a Diversity of Industries and Interests

- Drug Discovery and Development
- Informatics
- Clinical Diagnostics
- Technology Transfer
- Laboratory Instrumentation
- Synthetic Chemistry
- Healthcare

SLAS2015 Educational Tracks

- Assay Development & Screening
- Automation & High-Throughput Technologies
- Bioanalytical Techniques
- Biomarker Discovery & Applications
- Drug Target Strategies
- Informatics
- Micro/Nano Technologies

KEYNOTE PRESENTERS

Francis Collins
Director, U.S. National Institutes of Health (NIH)

Donald E. Ingber
Harvard University

Laurie Garrett
Renowned Author and Authority on Global Health Issues

Scan the code with your mobile device to go directly to **SLAS2015.org**

slas SOCIETY FOR LABORATORY AUTOMATION AND SCREENING

Be in your element.

PITTCON® 2015
CONFERENCE & EXPO

March 8-12, 2015
New Orleans, LA
Morial Convention Center

Follow us for special announcements

Make the smart choice

Register now to attend Pittcon 2015, the world's largest annual conference and exposition for laboratory science.

- See product innovations from leading companies
- Discover the latest scientific research in a wide range of disciplines
- Network with colleagues from around the world

Learn why thousands of your colleagues say "Pittcon is a must-attend event."

Visit www.pittcon.org

DISCARD CYLINDERS BY GENERATING YOUR OWN GAS

By Ed Connor, *GC Product Specialist*, Peak Scientific Instruments Ltd

The majority of laboratories worldwide use gas cylinders to supply their analytical instruments, sample prep systems and other lab applications. The cylinder suppliers often have long-term agreements with their customers, offering a solution that is relatively cheap and can easily be built into lab overheads. Many lab managers don't think past this point. Gases are required for analyses, and an established solution is in place which is paid along with the electricity and heating bills so the cycle of cylinder orders, deliveries, collections and invoice payments continues.

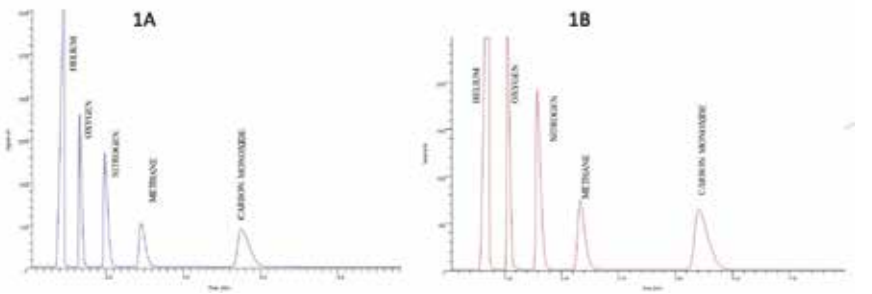
Gas generators have been on the market for over 20 years and offer a safe, convenient and cost-effective alternative to cylinders. An LC/MS using 32 liters per minute (1.13 CFM) of nitrogen for 8 hours per day will consume around 5.5 million liters (194,230 ft3) of nitrogen in 1 year of operation. This is equivalent to 620 cylinders.

What also needs to be factored into the costs required to satisfy these gas needs is the time taken for ordering, cylinder installation, processing of paperwork and a whole host of other factors that use employee time.

Now if we take the example above and look at the costs associated with the purchase, installation and running costs of a generator which produces 32 liters per minute (1.13 CFM) of nitrogen to supply the LC/MS, we have seen in our experience that within 1 year or better, we would already have paid back the cost of the generator with money to spare. From that point onward, the only costs associated with the generator are maintenance and running costs (electricity), which are negligible compared with the costs associated with cylinder deliveries, rental and administrative time.

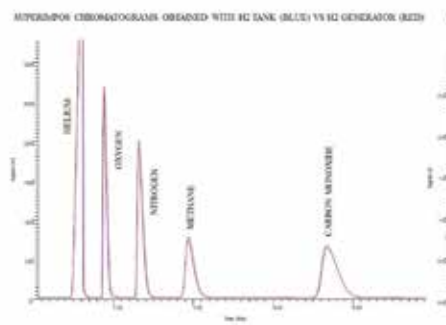
Another advantage of using gas generators as well as convenience is their safety. Cylinders contain a large volume of stored gas which can present a danger if released rapidly into the lab environment. In the case of hydrogen, there is the additional explosion risk. Once the level of hydrogen reaches 4.1% by volume in air, the lower explosion limit is reached, meaning that ignition of the gas could cause an explosion. A large hydrogen cylinder containing 9,000 liters (318 ft3) of compressed hydrogen contains enough gas to reach the LEL for a 220 m3 (7,770 ft3) room.

A hydrogen generator offers a safe alternative, producing enough hydrogen to supply a number of applications, without the requirement for bulk storage of gas. Using a GC-TCD, we analyzed a gas mixture of oxygen, nitrogen, methane and carbon monoxide in balance helium. Results showed no difference in performance by either gas, showing that a hydrogen generator is a safe alternative to cylinders while offering excellent performance.

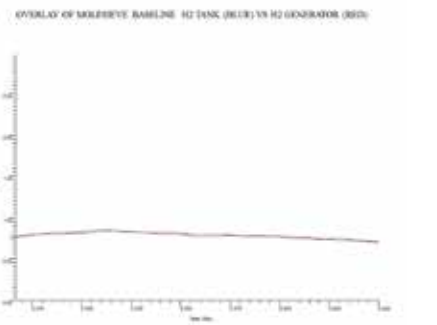


▲*Figures 1A & 1B: Analysis of gas mixture using hydrogen from a generator (1A) and a gas cylinder (1B).*

Figures 1A and 1B show results of analysis using hydrogen from the generator and a hydrogen gas cylinder. Figure 2 shows an overlay of results from the generator and cylinder demonstrating identical performance of the two gas sources. Figure 3 shows TCD baseline.



▲*Figure 2: Overlay of gas analysis results using Cylinder (blue) and hydrogen generator (red).*



▲*Figure 3: GC-TCD baseline results using cylinder (blue) and hydrogen generator (red).*

Results of the analysis show that a hydrogen generator can be used to produce carrier gas that will give comparable results to cylinders without the associated risks of storing large volumes of hydrogen in the lab.

PEAK SCIENTIFIC
FIND OUT MORE
Call: +44 141 812 8100
Email: marketing@peakscientific.com
www.peakscientific.com

It was a curious Scot that discovered life-saving penicillin.

We also design the world's best Gas Generators.

Sir Alexander Fleming was a Scottish biologist and pharmacologist who won a Nobel Prize for discovering the world's first antibiotic. But Scottish inventiveness didn't stop there...

Today, Peak Scientific gas generators also proudly represent Scottish innovation. Manufactured to ever higher standards and with new features appearing regularly, Peak's gas generator range offers innovation, reliability, and the assurance of peak performance.

Add to this, world class after sales care and you can see why Peak Generators are used in some of the most sophisticated labs in the world.

PEAK® SCIENTIFIC

EXPECT INNOVATION

FIND OUT MORE

Call: +1-866-647-1649
Email: marketing@peakscientific.com

www.peakscientific.com

ADAM EQUIPMENT'S NIMBUS BALANCE DELIVERS SKY-HIGH PERFORMANCE AND DOWN-TO-EARTH VALUE

The new Nimbus range of lab balances from Adam Equipment provides a streamlined weighing experience for discerning scientists worldwide.

Innovative design enables a compact footprint, so the Nimbus occupies a minimal amount of space on the laboratory bench but maintains the highest levels of performance.

The base for the Nimbus is formed from a single piece of extruded aluminum, offering greater stability and highly repeatable results.

Crafted from a single block, the weighing sensor in the Nimbus has been optimized and contains fewer parts than a traditional force motor balance, improving the lifespan of the balance. Highly efficient mechanics combined with improved processing power of the electronics leads to more consistent results and notably superior performance.

Software for the Nimbus provides all the features necessary for the demands of everyday laboratory work. With 10 weighing units, including a customizable unit, the Nimbus capably handles parts counting, percentage weighing, density measurement for liquids or solids, and dynamic/animal weighing. Intuitively designed, the navigation buttons are large and color-coded, helping users operate the balance and perform functions with a minimal amount of training.

The Nimbus boasts comprehensive communication capabilities, so it is ideal for use with Adam DU software, which is used to efficiently gather and analyze information from multiple balances. Data collection and transmission are optimized with the Nimbus's USB and RS-232 interfaces, while a third interface allows for an optional remote display.

The Nimbus is available in a choice of 15 different models with a full breadth of readabilities ranging from 0.1mg to 0.1g. Nimbus analytical balances with 0.1mg readability are equipped with a glass-enclosed weighing chamber, which disassembles quickly for easy cleaning. Nimbus precision balances with 0.001g readability come with a round glass shield to help minimize the effects of air movement. Top-loading balances with readabilities of 0.01g and 0.1g are available in a selection of platform sizes. Text prompts that conveniently remind users of the current function/weighing mode are readily visible on the backlit display.

For precision weighing, Nimbus is the right balance for everyday lab work.

Using the USB or RS232 connection, results from Nimbus balances can be compiled and graphed with Adam DU software.

About Adam Equipment

For more than 40 years, Adam Equipment has designed and manufactured precision balances and scales for professionals worldwide in the laboratory, medical, education, industrial, food, animal/veterinary and jewelry markets. Adam is committed to offering an extensive selection of weighing equipment with best-in-class value. Headquartered in the United Kingdom, the company has strategically established offices in the United States, South Africa, Australia and China to provide product support and speedy delivery to distributors. For more information about the company and its products, go to www.adamequipment.com.

ADAM®
PERFECT BALANCE
Speed, Performance, Value

Ruthanne Bell
Adam Equipment
r.bell@adamequipment.com
203-790-4774

OPTIMA XPN AND AVANTI JXN SERIES CENTRIFUGES DESIGNED TO HANDLE THE MULTI-USER LAB WITH EASE.

Save Time and Improve Safety

Shared facilities, or common equipment rooms shared by several individual laboratories, often result in a laboratory having a number of unique users with varying levels of experience using floor-standing ultracentrifuges and high-performance centrifuges. This presents unique challenges to lab managers and facilities managers responsible for ensuring safe operation, maximizing uptime, and minimizing maintenance costs associated with these centrifuges. These tasks are easier to accomplish using features built into Optima XPN ultracentrifugues and Avanti JXN Series high-performance centrifuges by Beckman Coulter Life Sciences. This allows laboratories to focus on quality sample preparation and research results, instead of extensive training.

Easy to Use

Users will find it easy to learn, read and navigate the large LCD touch screen on these instruments, even from across the lab. The Windows®-based user interface makes training and usage easier while reducing setup time and the possibility for errors. Users can focus on getting results rather than learning the instruments. An on-screen context-sensitive "help" feature puts answers at the user's fingertips, saving time and effort. Up to 1,000 user-defined programs consisting of up to 30 steps each are available on the Optima XPN and Avanti JXN Series, so that virtually any protocol can be set up and stored for future use.

Protected Access

Password protection for up to 50 unique user profiles enables multi-user laboratory environments to control access. It's simple to allow users the appropriate security levels–Administrator, Super User or Operator. This way, the lab manager can control the level of access each user has to the centrifuge according to the permissions that follow. And with remote access, the user management can be done by the lab manager without leaving the office.

Detailed Run History and Rotor Tracking by Serial Number

Powerful tracking capability eliminates the need for paper logbooks that require manual entries. It also ensures that details of each and every run are recorded and linked to a specific user, which adds a level of accountability into the laboratory. Detailed run tracking builds an archive of each run that includes: the user operating the centrifuge, date/time, run parameters, and any diagnostics or errors that were issued during the run.

Users can also track the number of cycles accumulated on specific rotors used with Optima XPN and Avanti JXN Series centrifuges.

Freedom

In multi-user environments, users may find themselves having to walk down the hall, to another floor, or even into another building to get to centrifuges in a common equipment room. With remote monitoring and control of the Optima XPN and Avanti JXN Series centrifuges, users can access the centrifuge from virtually anywhere via personal computer or mobile device using the custom MobileFuge application available for iOS and Android™ devices. Using the email diagnostic alerts feature, lab managers can be notified whenever there is an issue with a centrifuge. This feature notifies lab managers of any issues, regardless of their location.

BECKMAN COULTER
Life Sciences

Phone: (800) 526-3821
www.beckmancoulter.com

PURELAB®Chorus

The **PURELAB® Chorus** range of laboratory water systems offers customers the ability to customize a system to fully optimize to best fit their application, budget and the configuration of their laboratory – all without compromising on water quality or the visual appeal of the unit. PURELAB® Chorus systems are well suited in laboratories with limited laboratory space and that must retain precise control over dispensing methods and storage options.

The PURELAB® Chorus range includes three water purification systems specifically designed to deliver the necessary water quality at the required through-flow – Chorus 1 for ultrapure Type I+/I, Chorus 2 for pure Type II, and Chorus 3 for general pure grade Type III water.

PURELAB® Chorus 1 produces the highest inorganic water purity available by applying advanced PureSure® deionization, which removes even trace amounts of those ions that could otherwise interfere with ultrasensitive analysis methods such as HPLC, Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry or ICP Mass Spectrometry. Constant real-time total organic carbon monitoring provides complete confidence in the organic purity of the water. In addition, the employment of integrated ultrafiltration/microfiltration, full spectrum UV treatment and full recirculation guarantees the highest organic purity of the water at the point of use, with complete removal of endotoxins, proteins, nucleases and particulates. This makes it ideal for even the most sensitive of applications.

PURELAB® Chorus 2 is the optimal fit for those applications requiring reliable, high purity water with good organic, inorganic and microbial control, but where ultrapure water is not essential. These include electrophysiology, histology and general chemistry.

The PURELAB® Chorus 3, offers the lowest cost of ownership and provides high flow rates of up to 120 liters per hour, all while being simple to operate and easy to maintain. The smart system has an auto rinse function to maintain purity during periods of low use, offers the option of CO2 removal and is designed to allow flow rate to be easily upgraded to meet future demands. As such, it is optimized for all the workhorse applications of the lab, where purity must be effectively balanced against speed to provide the most effective water supply for general use.

Flexibility extending to dispensing and storage

The PURELAB® Chorus systems work seamlessly with ELGA's Halo dispensing solutions, all of which can be positioned independently from the water purification system for maximal flexibility and ensure that valuable laboratory space is used effectively. The flow is adjustable from drop-by-drop up to two liters per minute, allowing users to fill their containers as slowly or as fast as is needed. ELGA's unique portfolio of storage reservoirs completes the range, offering 15, 30 and 60 liters of compact storage, all designed to reduce the risk of downtime during periods of heavy use, without impacting on water quality.

ELGA

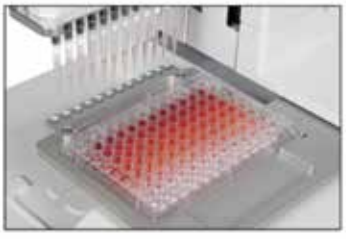
5 Earl Court, Woodridge, IL 60517
630-343-5251
Email: elga.usa@veolia.com
www.elgalabwater.com

Automate your multichannel pipettes

Multichannel pipettes are invaluable when working with multiwell plates. However, prolonged and repetitive pipetting sessions bear the risk of strain and fatigue, often resulting in repetitive strain injuries (RSI) and less reproducible results. VIAFLO ASSIST together with INTEGRA's VIAFLO II electronic pipettes form the perfect symbiosis to prevent users from RSI and to significantly increase the reproducibility of prolonged pipetting protocols such as serial dilutions, plate filling and reagent addition. By mounting a VIAFLO II electronic pipette on the VIAFLO ASSIST, the pipette's protocols can be carried out fully automatically.

TYPICAL APPLICATIONS

Serial Dilutions

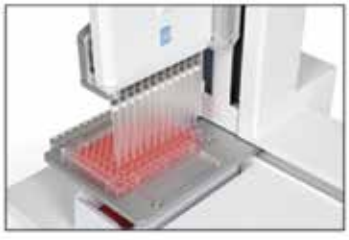


Serial dilutions can be tedious due to the many mixing steps that are required. VIAFLO ASSIST carries out your serial dilution protocols automatically. Simply define the number of mixing cycles, speed and mix volume.

Serial dilutions are often carried out with the plate in portrait orientation. This allows more samples to be diluted. VIAFLO ASSIST allows working in landscape and portrait format.

The concentrated sample can be drawn from a reagent reservoir, a PCR tube strip and the plate itself (e.g. First column). In addition, the sample can also be aspirated with the pipette from an external source before placing it on the VIAFLO ASSIST and starting the protocol.

Plate Filling



Filling multiple plates might not be a difficult task but is strenuous nonetheless. In order to improve pipetting ergonomics, manual pipetting should be minimized.

VIAFLO ASSIST helps you to fill microplates without risking repetitive strain injury.

Reagent Addition

Draw reagent from the reagent reservoir, a PCR tube strip , the plate itself or an external source to add it to the target plate.

An optional mixing step helps to achieve a homogenous distribution of the sample.

For a precise liquid transfer and to make sure that no remaining liquid clings to the tip end, performing a touch off is common practice. VIAFLO ASSIST allows both a touch off on the side wall of the well or inside the liquid.

Watch a video: http://www.integra-biosciences.com/sites/viaflo_assist.html#video

Download product brochure: http://www.integra-biosciences.com/sites/pdf/flyer/127951_V01_Flyer_VIAFLO_Assist_EN.pdf

INTEGRA

2 Wentworth Drive
Hudson, NH 03051
USA
Phone: 603 578 5800
Website: www.integra-biosciences.com

Highly dynamic systems of the PRESTO® series employ cutting edge temperature control technology. Numerous functions make day-to-day tasks easier and deliver the thermodynamic power needed to handle even the most demanding external applications. See for yourself what makes the dynamic temperature control systems so unique and take advantage of their special features.

HOT & COLD

Reactor temperature control, tests for all kinds of substances or temperature simulation – the PRESTO® are made for highly precise temperature control and rapid temperature changes. PRESTO® provide large heating and cooling capacities covering a working temeprature range from -40 °C to +250 °C. Highly efficient components allow extremely fast compensation of exothermic and endothermic reactions.

For optimized performance during operation the maximum heating capacity adjusts automatically to the power input of the main power supply (A40,W40). The PRESTO® is hydraulically sealed. Temperature induced volume changes within the heat exchanger are accommodated by an integrated cooled expansion vessel.

STAY IN TOUCH

A special feature of the PRESTO® is the integrated 5.7" industrial touch screen. All important information is displayed clearly and concisely enhancing ease of use considerably. The PRESTO® can be operated intuitively with the tip of your finger.

PUMP POWER

The PRESTO® provides continuous parameter monitoring for the right pressure at any time. The pumps dynamically compensate for any viscosity changes of the temperature control fluid (A40, W40). Permanent internal monitoring and self-lubricating pumps ensure a long operating life of the PRESTO®. Another feature is the closed temperature control circuit. The bath fluid has no contact with ambient air, meaning no moisture and no oxidation. This results in a significant increase in the lifetime of the bath fluid. The closed circuit also prevents the PRESTO® from releasing oil vapors.

ALWAYS READY

The PRESTO® works with one bath fluid covering the entire working temperature range. That saves you from frquently changing the bath fluid and stocking extra bath fluid. The filling funnel of the PRESTO® is easily accessible at the top of the unit.

As the PRESTO® operates whisper quiet, you will hardly hear them in your laboratory. Even at high room temperatures of up to +40 °C will not make the PRESTO® sweat. Maintenance-free pumps and drives also guarantee operational readiness.

ONE OF A KIND

The new PRESTO® are the only highly dynamic temperature control systems with closed sides – a JULABO tradition. A key requirement for development is the consistent channelling of airflow from the front to the back. This design does away with venting slots at the sides. The required installation space is reduced to a minimum, so the PRESTO® can easily fit into tight spaces.

JULABO continues as one of the world's leading experts for temperature control systems. Our high-quality products, systems and solutions have influenced the development and progress of temperature control. Contact us today to learn what our PRESTO® units can do for you.

Julabo
THE TEMPERATURE CONTROL COMPANY

JULABO USA, Inc.
884 Marcon Blvd
Allentown, PA 18109
(610)230-0250Fax (610)231-0260
www.julabo.com

MP Biomedicals introduces the FastPrep-24 5G™! The most advanced sample preparation instrument yet!

INTRODUCTION:

Mechanical sample lysis is rapidly becoming the preferred sample preparation method in life science labs for the isolation of DNA, RNA, proteins, metabolites and other small molecules because the elimination of chemicals, enzymes, and detergents minimizes the introduction of potential inhibitors to downstream processes. The FastPrep-24 5G™ (Fig. 1) is the newest innovation in beat-beaters and produces the fastest lysis of even the most difficult samples.

OVERVIEW:

The FastPrep-24 5G is a software controlled, standalone instrument, designed with a first-of-its-kind user-friendly touch screen interface as well as many unique and innovative features. The high-speed, benchtop reciprocating instrument is intended for the optimal lysis of challenging and routine sample types. It is intended for use in applications that require grinding, lysing or homogenization of various solid sample materials. Sample types include but are not limited to the following: all types of human, animal and plant tissues including cultured cells; bacterial, yeast and fungal cells, including spores and oocytes; and environmental and metagenomic samples including soil and fecal samples.

Fig 1, The FastPrep-24 5G™ Homogenizer System

INNOVATIVE FEATURES:

MP Bio, the leader in Sample Preparation, proudly introduces the newest member of the FastPrep Family of Sample Preparation Systems, The FastPrep-24 5G! The state of the art 5G system provides micro-processor control with a touch-screen user interface that gives you knowledge and power at your fingertips. Some of the new features include:

- **Powerful-** Highest speed available, improves quality of analytes
- **Intuitive**- Over 70 Recommended Programs, Just Pick and Start!
- **Flexible**- Optional sample holders allow processing up to 50 ml size under ambient or cryogenic conditional
- **Complete**- Lysing Matrix Tubes and Purification Kits from One Source

The heartbeat of the FastPrep-24 5G is the touch screen display with microprocessor control (fig 2). The display is a large, 7" diagonal high-definition monitor that is activated by a touch of the finger. The microprocessor controls the Graphical User Interface allowing the end-user to easily navigate through a choice of >70 MP Bio Recommended Programs, User-defined Saved Programs, or User-defined Custom Programs.

Fig 2, Touch screen displaying Recommended Programs by sample type

Fig 3, USB Port on rear panel

Recommended Programs are the heart of the 5G's functionality. These validated programs include all variable assay parameters. This is a valuable optimization tool for new users and is of special interest to those who are working with pathogenic or dangerous samples, as well as low abundance samples.

The highest available power, and the unique optimized motion, lyses samples by the multidirectional, simultaneous impaction of specialized lysing matrix particles. The FastPrep-24 5G provides quick, efficient and highly reproducible homogenization, getting your DNA, RNA and proteins into the protective buffer faster, resulting in higher quality and yields!

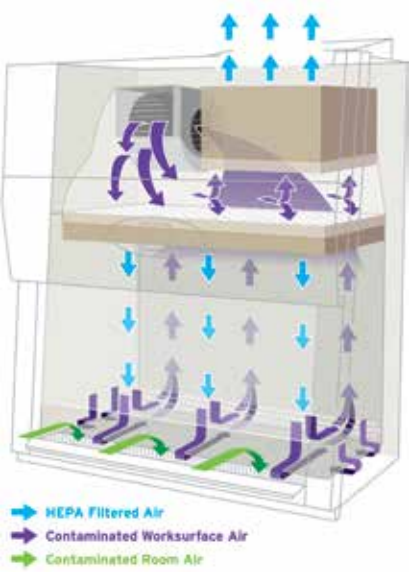
The USB port allows users to upgrade software as they become available easily by simply connecting to a laptop or PC (fig 3). A custom FastPrep App uploads new software versions quickly to the instrument. The App also allows the option to download assay history from the 5G's memory to the attached computer in the form of a CSV file. This feature is of critical importance in lab settings were run verification/ documentation is necessary.

CONCLUSIONS:

The FastPrep-24 5G is a novel, ultra-high performance, sample preparation system that allows for the extraction of fully intact, biologically functional macromolecule from routine as well as highly resistant samples. Learn more at www.mpbio.com/fastprep5G

MP Biomedicals, LLC
3 Hutton Centre Drive, Santa Ana, CA 92707 USA
800-854-0530
www.mpbio.com

TIPS FOR WORKING IN YOUR NUAIRE BIOLOGICAL SAFETY CABINET



Good technique when working within a Class II Biological Safety Cabinet (BSC) will minimize air turbulence, prevent splatter or unwanted spread of aerosols, and maximize potential protection of personnel, product and environment.

TIP 1: KNOW YOUR AIRFLOW

Biological Safety Cabinets provide personnel, product, and environmental protection through the use of HEPA filtered air. Knowing how the air is passed through the cabinet is essential. Contaminated Room Air enters the cabinet crossing over the work surface contaminating the air, passing it up through the HEPA filter for clean air.

TIP 2: WORK AT THE PROPER SASH LEVEL

Proper airflows are reached by a certifier measuring air speed on an annual basis (or more), ensuring the cabinet is fully operational to provide personnel, product, and environmental protection.

TIP 3: NEVER COVER THE AIR GRILL

Covering the air grill compromises airflow integrity and can cause laboratory air to enter the work zone or even work zone air to enter the laboratory environment.

TIP 4: MINIMIZE MOVEMENT

Move arms in and out slowly, perpendicular to the face opening of the cabinet reduces the risk of air barrier containment disruption. Other personnel activities in the room (e.g., rapid movement, open/closing room doors, etc.) may also disrupt the cabinet air barrier.

TIP 5: REDUCE SPLATTER

Good microbiological techniques will minimize splatter and aerosol generation. Class II cabinets are designed so that horizontally nebulized spores will be captured by the downward flow of cabinet air within fourteen inches (35cm) of travel. Keeping clean materials at least twelve inches (31cm) away from aerosol-generating activities will minimize the potential for cross-contamination.

TIP 6: KNOW YOUR WORK AREA

All operations should be performed at least 4 inches from the front grille, in the middle third of the work surface area.

TIP 7: WORK FROM CLEAN TO CONTAMINATED

Active work should flow from clean to contaminated area across work surface Materials and supplies

should be placed in such a way as to limit the movement of "dirty" items over "clean" ones.

TIP 8: WORKING WITH TUBES

Open tubes or bottles should not be held in a vertical position. Bottle or tube caps should not be placed on the toweling. Items should be recapped or covered as soon as possible.

TIP 9: WORKING WITH PETRI DISHES

Investigators working with Petri dishes and tissue culture plates should hold the lid above the open sterile surface to minimize direct impaction of downward air.

TIP 10: WORKING WITH ASPIRATOR BOTTLES OR SUCTION FLASKS

Aspirator bottles or suction flasks should be connected to an overflow collection flask containing appropriate disinfectant, and to an in-line HEPA or equivalent filter. This combination will provide protection to the central building vacuum system or vacuum pump, as well as to the personnel who service this equipment.

NuAire, Inc.
2100 Fernbrook Lane, Plymouth, MN 55447
Toll Free: 1.800.328.3352 | Phone: 763.553.1270
Fax: 763.553.0459 | E-mail: sales@nuaire.com

Selectively Remove Phospholipids from Biological Matrices

Excessive background from endogenous sample matrix components has always been of great concern in bioanalysis, and has become paramount today with the need for decreasing analytical run times. In bioanalytical mass spectrometry, the issue of excessive background contributes to the problem of ion-suppression. Ion-suppression is caused by one or more interfering components or species that co-elute with the analyte(s) of interest during LC-MS analysis, and manifests itself as a loss of analyte response. The co-eluting species can affect droplet formation or ionize concurrently, resulting in an erroneous decrease (suppression) in analyte signal response. The end result is poor assay reproducibility, also losses in accuracy and sensitivity.

One of the major causes of ion-suppression in bioanalysis is the presence of phospholipids during LC-MS analysis. Phospholipids are prevalent in extremely high concentrations in blood-based biological fluids (~1 mg/mL); and represent the second largest lipid component in biological matrices after triglycerides.

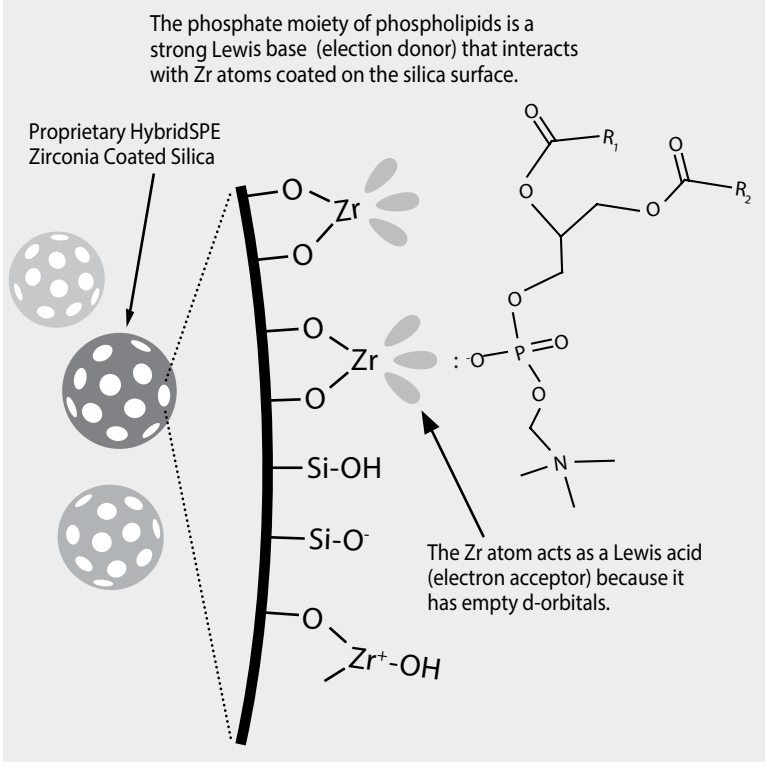
In addition to ion-suppression, phospholipids may build up on the analytical column. They may elute uncontrollably downstream in an injection run sequence, causing unpredictable ion-suppression effects and poor reproducibility. If gradient conditions are used to elute phospholipids, this leads to longer analysis run times.

Solution

HybridSPE-Phospholipid technology is a sample prep platform designed to selectively remove endogenous protein and phospholipid interferences from biological plasma and serum prior to LC-MS or LC-MS-MS analysis. Biological plasma or serum is first subjected to protein precipitation by adding the sample to the HybridSPE 96-well plate followed by acidified acetonitrile (precipitation agent). The filter/frit assembly acts as a depth filter, physically removing the proteins, while concurrently removing the phospholipids via Lewis acid-base interactions. The HybridSPE-Phospholipid packed bed consists of proprietary zirconia coated silica particles. The zirconia sites exhibit Lewis acid (electron acceptor) properties that interact strongly with Lewis bases (electron donor). The phosphate group, inherent with all phospholipids, acts as a very strong Lewis base that will interact intensely with zirconia atoms functionalized on the particle surface. After the protein-precipitated sample passes through the HybridSPE-Phospholipid device, the resulting effluent is phospholipid-free and ready for immediate LC-MS or LC-MS-MS analysis.

Formic acid is a critical modifier used in the precipitation agent to improve the recovery of many analytes of interest (e.g., acidic compounds); it plays a critical role in preventing analyte retention without affecting the phospholipid retention/removal process.

In summary, HybridSPE-Phospholipid products are valuable tools in LC-MS analysis. They help to eliminate both ion-suppression and the need for long gradient run times to elute on-column phospholipid build-up. For additional information, or to try a free sample, please visit sigma-aldrich.com/hybridspe.


The phosphate moiety of phospholipids is a strong Lewis base (election donor) that interacts with Zr atoms coated on the silica surface.
Proprietary HybridSPE Zirconia Coated Silica
Si-OH
Si-O-
Zr+-OH
The Zr atom acts as a Lewis acid (electron acceptor) because it has empty d-orbitals.

SIGMA-ALDRICH®
www.sigmaaldrich.com

HIGH ENERGY BALL MILLING EQUIPMENT

The aim to achieve ultrafine and nano-sized materials is becoming of great importance as effort in nanotechnology is a key driver in the development of innovative products. To attain particles in this region, many techniques can be used such as synthesizing such materials as well as high energy milling.

Retsch offers a full complement of high energy ball milling equipment.

The planetary ball mill offering from Retsch continues to be a key research tool in many labs that are in need of achieving finely ground sample particles in addition to submicron materials and mechanical alloying. The planetary ball mill has been the historical "go-to" instrument for fine grinding applications.

For customers with small samples that require finely ground material, the Retsch mixer mills are an optimal choice. With the ability to process small sample quantities to a fine powder in a relatively short time, these units are used in many research facilities for these homogenizing requirements. Also, the Retsch mixer mills are often used in the area of mechanochemistry research as sample size and grinding energy are ideal for such applications.

In addition to high energy planetary ball mills and mixer mills, the Retsch Cryomill is specially designed for cryogenic grinding with an integrated liquid nitrogen cooling system. It is an ideal solution for customers that need to keep material at -196°C to avert degradation of sample and/or to bring material to its glass transition state for efficient grinding.

The EMAX is a newly designed and released high energy ball mill that brings a new technology/technique to the sample preparation laboratory. The EMAX is designed specifically for high energy ball milling as it features a variable speed drive up to 2000rpm, and considering the high rpm levels also features an internal water cooling system that can also be adapted to an external chiller, thus eliminating down time from overheating. With these functional performance features, the EMAX also has a special grinding jar and motion that optimizes the grinding energy and force in order to attain ultrafine and nano-sized materials.

As an industry leader in sample preparation, Retsch prides itself on maintaining and continually developing its product portfolio to meet the requirements and demands of our customers. With a full team of trained application specialists, Retsch is always looking forward to addressing customer's applications and requirements.

VERDER scientific

866-473-8724
info@verder-scientific.us

NEXT GENERATION OF CO2 INCUBATORS FOR DEMANDING CELL CULTURE APPLICATIONS

Direct heat incubator with latest, proven technologies designed for reliable, reproducible results

Cell culture scientists working with sensitive cultures such as stem and primary cells, can turn to a new CO2 incubator that combines the latest technologies for optimal cell growth and contamination control designed to create uniform growth conditions with consistency and reliability.

The Thermo Scientific Heracell VIOS incubator series is ideal for academic research and pharmaceutical applications, allowing scientists to maximize their productivity with excellent reproducibility, reliability and efficiency.

"Reproducibility and contamination prevention are critical when it comes to sensitive cultures in order to ensure the integrity of your research," said Doug Wernerspach, global business director, Thermo Fisher Scientific. "Our new Heracell VIOS series leverage our long history of CO2 technology leadership with innovations, including our new THRIVE active airflow and proven decontamination that are critical for today's demanding cell culture applications."

Incorporating the breakthrough THRIVE active airflow technology, the Heracell VIOS delivers a homogeneous culturing environment with fast recovery for unwanted variation. Designed to protect valuable cultures from contamination, the Heracell VIOS is equipped with:

- ISO class 5 HEPA filters to protect against airborne microbes and particulates
- Steri-Run, a fully automatic on-demand overnight 180°C sterilization cycle assures uniform 6-log high-temperature sterilization on all surfaces
- Condensation-free chamber with covered, protected humidity reservoir
- 100 percent pure copper interiors to provide lasting sustainability and easy maintenance

For operation simplicity, the intelligent iCAN touchscreen interface provides complete data visibility to monitor all incubator interaction, featuring on-screen menu prompts, error and usage monitoring, downloadable data logging with a standard USB, performance trend graphing and multiple language selection, including English, Spanish, German, French, Italian, Japanese and Mandarin.

More information on the Thermo Scientific Heracell VIOS CO2 incubator series can be found by visiting www.thermoscientific.com/heracellvios.

About Thermo Fisher Scientific

Thermo Fisher Scientific Inc. is the world leader in serving science, with revenues of $17 billion and 50,000 employees in 50 countries. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and increase laboratory productivity. Our four premier brands – Thermo Scientific, Life Technologies, Fisher Scientific and Unity Lab Services – offer an unmatched combination of innovative technologies, purchasing convenience and comprehensive support. For more information, please visit www.thermofisher.com.

Thermo SCIENTIFIC
A Thermo Fisher Scientific Brand

www.thermoscientific.com/heracellvios

PROFILES

TISSUE AND CELL DISPERSION HEADQUARTERS

BioSpec Products provides equipment, supplies and expert advice on mechanical tools used to homogenize, disperse or pulverize laboratory-sized samples (1 mg - 10g) of tissue or microorganisms. Whether you require high or low throughput, a beadbeater or a rotor/stator homogenizer, beads or vials...BioSpec has it.

Innovative **Best Products** **Best Price**

Contact:
BioSpec Products
Bartlesville, Oklahoma
800-617-3363
info@biospec.com
www.biospec.com

SHEL LAB BACTRON300 ANAEROBIC CHAMBER

The BACTRON300 is an economical anaerobic environment system with air lock, a 17.6 cu.ft. workspace and a 300 plate capacity incubator which delivers optimum productivity in a compact space. The operator has total command of the work area, yet enjoys ample bench space for efficient performance of all procedures requiring an anaerobic atmosphere. SHEL LAB BACTRON systems have airtight construction of stainless steel and rigid Plexiglas for unobstructed vision and integrity. BACTRON300 anaerobic chambers have ergonomic armport doors, which ensure user comfort and minimize shoulder fatigue.

Contact:
SHEL LAB
800.322.4897
www.shellab.com

DID YOU FIND OUR FAKE AD?

DID YOU NOTICE AN AD IN THIS MONTH'S ISSUE THAT SEEMED UNUSUAL OR UNBELIEVABLE? IF NOT, YOU MAY WANT TO LOOK AGAIN. SOMEWHERE IN THIS ISSUE IS A HIDDEN FAKE AD. IF YOU FIND IT, SEND THE NAME OF OUR FICTITIOUS COMPANY TO **FAKEAD@LABMANAGER.COM** FOR A CHANCE TO WIN AN AMAZON GIFT CARD.

UNITED STATES POSTAL SERVICE

Statement of Ownership, Management, and Circulation (Requester Publications Only)

1. Publication Title	2. Publication Number	3. Filing Date
LAB MANAGER	0 0 0 2 - 4 1 8 8	9/30/14
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Eleven times a year	11	$120.00

7. Complete Mailing Address of Known Office of Publication (Not printer): The Ovid Bell Press, Inc. Agent for Foreign Corporation, PO Box 370, Fulton, MO 65251 — Contact Person: Greg Brewer, Telephone: 706-528-6888

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer): LabX Media Group, PO Box 216, 478 Bay Street, Midland, ON Canada L4R 1K9

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor:
Publisher: Edward Neeb, 415 Madison Ave, 15th floor, New York NY 10017-1111
Editor: Pam Ahlberg, 415 Madison Ave, 15th floor, New York NY 10017-1111
Managing Editor: Rachel Muenz, Assistant Editor, 415 Madison Ave, 15th floor, New York NY 10017-1111

10. Owner

Full Name	Complete Mailing Address
LabX Media Group	PO Box 216, 478 Bay Street, Midland
Bob Katato	ON Canada L4R 1K9

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → None

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☐ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526-R, August 2012 (Page 1 of 3)(Instructions Page 3) PSN: 7530-03-000-9333 PRIVACY NOTICE: See our privacy policy on www.usps.com.

13. Publication Title: LAB MANAGER	14. Issue Date for Circulation Data Below: September 2014	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	35,064	34,633
b. Paid Circulation (By Mail and Outside the Mail) (1) Outside County Paid/Requested Mail Subscriptions stated on PS Form 3541	34,354	34,154
(2) In-County Paid/Requested Mail Subscriptions stated on PS Form 3541		
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Paid or Requested Distribution Outside USPS®		
(4) Requested Copies Distributed by Other Mail Classes Through the USPS (e.g., First-Class Mail®)		
c. Total Paid and/or Requested Circulation (Sum of 15b (1), (2), (3), and (4))	34,354	34,154
d. Nonrequested Distribution (By Mail and Outside the Mail) (1) Outside County Nonrequested Copies Stated on PS Form 3541		
(2) In-County Nonrequested Copies Stated on PS Form 3541		
(3) Nonrequested Copies Distributed Through the USPS by Other Classes of Mail		
(4) Nonrequested Copies Distributed Outside the Mail	258	75
e. Total Nonrequested Distribution (Sum of 15d (1), (2), (3) and (4))	258	75
f. Total Distribution (Sum of 15c and e)	34,612	34,229
g. Copies not Distributed	452	404
h. Total (Sum of 15f and g)	35, 064	34,633
i. Percent Paid and/or Requested Circulation (15c divided by 15f times 100)	99.3%	99.8%

16. ☐ Total circulation includes electronic copies. Report circulation on PS Form 3526-X worksheet.

17. Publication of Statement of Ownership for a Requester Publication is required and will be printed in the November 2014 issue of this publication.

18. Signature and Title of Editor, Publisher, Business Manager, or Owner — Date: 10/3/2014

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

PS Form 3526-R, August 2012 (Page 2 of 3)

MARKETPLACE

INTERNATIONAL ACCREDITATION SERVICE
Leading Accreditors Since 1975

Accrediting Test Labs

Rapid Scheduling and Assessments to ISO/IEC 17025

www.iasonline.org/LM
ILAC Signatory Testing, Calibration, Inspection

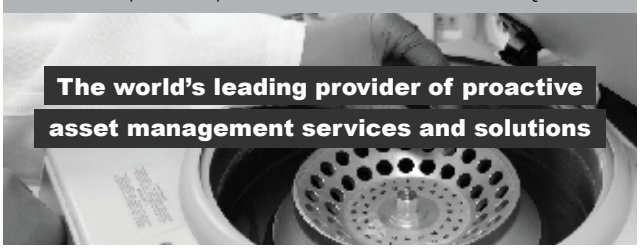
Get your head out of the cloud!
and get back into the SONN...
SONNTEK
Research Lamps
Focus on what REALLY matters
Signal to Noise, Reliability
Special Price: Buy 3
Call 201-236-9300 (we still answer phones!)

ADVERTISER INDEX

Company	URL	Page
A&D Weighing	www.andweighing.com/ion	13
Adam Equipment Inc.	www.adamequipment.com/nimbus	21
AMETEK Materials Analysis Division	icp-oes.spectro.com/BLUE	5
Anova	www.waterbaths.com	35
BAKER	www.bakerco.com	15
Beckman Coulter Inc.	www.beckmancoultercentrifugation.com	27
BINDER	www.binder-world.us	19
BioSpec Products, Inc.	www.biospec.com	39,88
BioTek Instruments, Inc.	www.cellimager.com	11
CONCOA	www.concoa.com	37
Conquer Scientific	ConquerScientific.com	89
Dri-Dek®	dri-dek.com	17
ELGA	www.elgalabwater.com	38
EMD Millipore	www.millipore.com/ultrapure	9
Eppendorf North America	www.eppendorfna.com/cellculture	92
EquipNet, Inc.	www.EquipNet.com	89
Federal Equipment Company	www.fedequip.com	89
Hettich Instruments, LP.	www.hettweb.com	49
International Accreditation Service, Inc.	www.iasonline.org	88
Labconco	www.labconco.com	55
Miele, Inc.	www.miele-pro.com	36
MP Biomedicals	www.mpbio.com	7
NuAire Inc.	www.nuaire.com	2
Panasonic Healthcare	us.panasonic-healthcare.com	3
Parker Hannifin Corporation	solutions.parker.com/conservehelium	29
Peak Scientific	www.peakscientific.com	77
Pittcon	www.pittcon.org	75
Pro Scientific Inc.	www.proscientific.com	12
Proton Onsite	www.ProtonOnSite.com	71
Retsch	www.retsch.com	47
SARSTEDT	www.sarstedt.com	23
SHEL LAB	www.shellab.com	31,88
SLAS	SLAS2015.org	74
Sonntek, Inc.	www.sonntek.com	88
SPEX SamplePrep	www.spexsampleprep.com	41
Thermo Fisher - Unity Lab Services	www.unitylabservices.com/smartcapture	25
Thermo Fisher Scientific Inc.	www.thermoscientific.com	6,53,57,59
Vacuubrand, Inc.	www.vacuubrand.com	14
Victor Equipment Company	VictorSpecialtyGasControl.com	91

The Advertisers Index is provided as a reader service. Although every attempt has been made to make this index as complete as possible, the accuracy of all listings cannot be guaranteed.

PRE-OWNED EQUIPMENT MARKETPLACE

EQUIPNET
www.EquipNet.com/LMM
sales@EquipNet.com
800 371 6555
APPRAISERS, BROKERS, AND AUCTIONEERS OF INDUSTRIAL EQUIPMENT


Federal Equipment Company
Equipment Solutions for Pharmaceutical, Laboratory, and Research Industries
216-271-3500
www.fedequip.com
pharmaceuticals@fedequip.com
8200 Bessemer Ave., Cleveland, OH 44127

PARTING POINTS

Takeaways from this month's issue:

THE GOOD, THE BAD, AND THE SELFIE

10

Social media has insinuated its way into every corner of the scientific enterprise. While social media has had a positive effect on the research community, it has also had negative effects. Main pros and cons of social media in the sciences include:

- Giving scientists a greater presence in the scientific world
- Making science more accessible/attractive to the general public
- Having a "cheapening" effect on science and scientists
- Hurting the reputations and careers of scientists who aren't careful

20

NEGOTIATING AGREEMENT

Have you ever presented a great idea, only to see it ignored while other less important things were discussed? Those in the STEM world prefer to trust in facts and figures, while discounting feelings. But feelings are an important part of getting people to listen to your ideas. To sell your ideas, you must:

- Break the ice
- Get the buyer to admit they have a need
- Deliver your solution to the buyer's need
- Wait for the buyer's decision to agree with you

28

GOT GAS?

If you are thinking of changing, updating, or modifying your current gas supply, consider that the overall success of your analytical workflow may depend on making the correct decision. When making that decision, it's important to consider:

- The pros and cons of the various supply options
- Budget constraints
- Demand
- What sort of gas pressure regulator is best

34

A PREVENTIVE APPROACH

Prevention programs are effective and do reduce workplace illnesses, injuries, and fatalities. Some specific guidelines for developing a solid, proactive approach to protecting your employees from potential hazards in the workplace cover factors such as:

- Hazard recognition, evaluation, and control
- Workplace design and engineering
- Safety performance management
- Regulatory compliance management

46

PERSPECTIVE ON: A CELL CULTURE LAB

Dr. Chris Fasano's lab at the Neural Stem Cell Institute in Rensselaer, New York is dedicated to finding the cause of autism. Some of the challenges and rewards of working with his young student employees include:

- Ensuring students aren't pushed too hard, as they are still learning
- Giving students a sense of ownership while building teamwork at the same time
- Keeping up the lab's morale during frustrating times
- Mentoring students

VICTOR®
AN ESAB® BRAND

PURE. PERFORMANCE.

Victor®, the name you know and trust, is synonymous with high performance and peace-of-mind quality. It's our mission to ensure that every user of our innovative technology has the best experience possible. We listen, and we deliver specialty gas control solutions that work exceptionally for you.

For more information, call 1-800-569-0547 or visit VictorSpecialtyGasControl.com.

Victor is a registered trademark of Victor Equipment Company.
© 2014 Victor Equipment Company.

eppendorf

Impress Yourself

The new Eppendorf Cell Culture Consumables

The all new product line of Eppendorf Cell Culture Consumables will truly delight your cells. Its outstanding design, reliability and purity is based on more than 50 years of experience. Products created by experts, developed for perfectionists. Impress yourself!

> Unsurpassed quality, clarity, purity and sterility, providing reliable cell culture conditions
> Significantly improved design for more safety and consistency
> Maximum safety and confidence during storage and transportation

www.eppendorfna.com/cellculture • 800-645-3050

052.A1.0101.B © 2014 Eppendorf AG.